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ABSTRACT

The following papers are included: "Collaborative Research: Lessons from the Tower of Babel" (Baldwin); "Establishing a Data Base for Intrainstitutional Research in the Allied Health Professions" (Von Son, Beiley); "Determining Research Needs in a School of Allied Health Professions" (Bottjen et al.); "Surveying Research Interests and Needs of Allied Health Educators" (Ballinger et al.); "Collaborative Research between the Allied Health Professional and Industry" (Lehmann); "The Interdisciplinary Approach to Health Promotion on Campus: Documentation of an Experiment in a Multiethnic Environment" (Tam et al.); "The Impact of an Interdisciplinary Master's Degree Program on Allied Health Professionals' Leadership Abilities" (Loesch, Rezler); "Recruitment of Minority Allied Health Professionals" (Wilson, Poindexter); "An Interdisciplinary Approach to Non-verbal Communication" (Skoloda et al.); "Autologous Transfusion: Interdisciplinary Program of Blood Conservation" (Rudmann); "Effects of General Health and Oral Hygiene on Oral Health" (Matthew, Huntley); "The Vestibular and Visual Systems Bases of Learning Disorder" (Powell, Barin); "Effect of Local Hydrocortisone Phonophoresis on Serum Glucose and Cortisone Levels in Mice" (McLane, Bork, Christian); "Attitudes toward and Knowledge of the Older Adult" (Hersch, Korba); "Needs Assessment of Medical-Surgical Clinic Patients To Determine Effective Methodology in the Presentation of Nutrition and Health Education Concepts" (Horvath, Snyder, Bishara); "Study To Determine Pedagogical Needs in Clinical Education" (Shea); "Planning for the Future: An Interdisciplinary Approach within a Division of Allied Health Professions" (Bongero et al.); "Quantitation of Somatomedin-C" (Ward et al.); "Weekly Interdisciplinary Patient Care Rounds" (Wuggazer); "Health Risk Appraisal" (Allen, Prendergast); "Study of Bioprosthetic Heart Valve Recovered from Humans" (Allen et al.); "Reliability of Isokinetic Endurance Tests" (Burdett et al.); "Functional Capacity of Patients prior to and after Bone Marrow Transplant" (Pfalzer, Tutschka, Harper); "Measurement of Oxidation Reduction Potential and Conductivity of Human Lymphocytes Following Binding by Antibody" (Harr); and "Continued Planning for Collaborative Research" (Snyder). (MN)

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COLLABORATIVE RESEARCH IN ALLIED HEALTH
1986

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COLLABORATIVE RESEARCH IN ALLIED HEALTH: 1986

Proceedings of

Collaborative Research in Allied Health Symposium, 1986

School of Allied Medical Professions
The Ohio State University
Columbus, Ohio

September 18, 1986

EDITOR
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PREFACE

A recent issue of the Omicron Nu Newsletter* carried an article on collaboration. In the article, Mitstifer discussed five characteristics of collaborators. She noted that cooperation and collaboration are often used interchangeably. However, these two terms have very different operational connotations. Cooperation is used to designate individuals working together to achieve separate and automomous goals. On the other hand, collaboration assumes shared responsibility and authority for basic policy decisions. In the process of working together, collaborators exhibit certain qualities.

> First, collaborators pool their authority, resources, and energies to achieve desired goals which the group holds in common.
>
> Second, collaborators are open to risk and innovation. The group may generate conflict, but no change is possible without some sense of dissatisfaction and willingness to invest energy in problem solving. True collaborators are open to change and are persistent in working toward common goals even though they experience some group conflict.
>
> Third, collaboration involves establishment of a community of people who have enthusiasm, flexibility, and shared culture. Each must hold mutual trust and respect for other group members.
>
> Fourth, collaborators need to have realistic expectations about available resources and limitations.
>
> Fifth, group leaders need to understand the change process and determine the factors that will either enhance or prevent change in their unique setting.

Many allied health educators and practitioners exhibit these qualities as they establish themselves in designated collaborative groups. Much progress has occurred since the first Collaborative Research Symposium in 1985, indicating growth among colleagues in this area.

These proceedings of the Second Collaborative Research Symposium are offered as evidence of progress in the field, a reference to promote collaborative work, and a resource to encourage other allied health educators and practitioners to become involved in research activities.

M. Rosita Schiller
John R. Snyder

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*Mitstifer, DI: Collaboration to fulfill our potential. Omicron Nu Newsletter, Summer, 1986.

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THE OHIO STATE UNIVERSITY
SCHOOL OF ALLIED MEDICAL PROFESSIONS

Collaborative Research in Allied Health Symposium
September 18, 1986

SCHEDULE

8:00	Registration and Coffee	
8:30	Introductions	**John R. Snyder, Ph.D.**
	Welcome	**Stephen L. Wilson, Ph.D.**
	Moderator	**John R. Snyder, Ph.D.**
8:40	Establishing a Data Base for Intrainstitutional Research in the Allied Health Professions	**L. George Van Son, Ed.D.** School of Allied Health Professions Ithaca College Ithaca, New York
9:00	Determining Research Needs in a School of Allied Health Professions	**Eric Bottjen, M.S., PT** School of Allied Health Professions University of Nebraska Medical Center Omaha, Nebraska
9:20	Surveying the Research Interests and Needs of Allied Health Educators	**Karen Flanigan, M.S., RRT** **Lorraine Jordan, CRNA, M.S.** School of Allied Medical Professions The Ohio State University Columbus, Ohio
9:40	Collaborative Research Between the Allied Health Professional and Industry	**Craig Lehmann, M.S., CC(NRCC)** School of Allied Health Professions State University of New York Stony Brook, New York
10:00	Break	
10:20	The Interdisciplinary Approach to Health Promotion on Campus: Documentation of an Experiment in a Multi-ethnic Environment	**Thomas Tam, Ph.D., M.P.H.** Herbert H. Lehman College City University of New York Bronx, New York

10:40 The Impact of an Interdisciplinary Master's Program on Allied Health Professionals' Leadership Abilities	**Thomas Loesch** Center for Educational Development University of Illinois at Chicago Chicago, Illinois
11:00 Recruitment of Minority Allied Health Professionals: An Enrichment Workshop Based on Profiles of Successful Practitioners	**Peggy Wilson, M.S., MT(ASCP)SM** **Patricia Poindexter, B.S. MT(ASCP)** School of Allied Medical Professions The Ohio State University Columbus, Ohio
11:20 An Interdisciplinary Approach to the Development of a Non-verbal Communication Program	**Thomas E. Skoloda, Ph.D.** Veterans Administration Medical Center Coatesville, Pennsylvania
11:40 Lunch	
12:30 Collaborative Research: Lessons from the Tower of Babel	**DeWitt C. Baldwin, Jr., M.D.** Director of Education Research American Medical Association
1:10 Autologous Transfusion: Interdisciplinary Program of Blood Conservation	**Sally V. Rudmann, Ph.D., MT(ASCP)SBB** School of Allied Medical Professions The Ohio State University Columbus, Ohio
1:30 Effects of General Health and Oral Hygiene on Oral Health	**Diane E. Huntley, R.D.H., Ph.D.** College of Health Professions The Wichita State University Wichita, Kansas
1:50 The Vestibular and Visual System Bases of Learning Disability: A Pilot Study	**Kamran Barin, Ph.D.** Department of Otolaryngology The Ohio State University Columbus, Ohio
2:10 Effect of Local Hydrocortisone Phonophoresis on Serum Glucose and Cortisone Levels in Mice	**Mary Ann McLane, M.S., CLS** College of Allied Health Professions Temple University Philadelphia, Pennsylvania
2:30 Break	

2:50	Attitudes Toward and Knowledge of the Older Adult: A Survey of Prospective Health Care Professionals	**Gayle Hersch, M.S., OTR** **Elaine Korba, M.S., RPT** Indiana University School of Medicine Indianapolis, Indiana
3:10	Needs Assessment of Medical-Surgical Clinic Patients to Determine Effective Methodology in the Presentation of Nutrition and Health Concepts	**Margaret C. Horvath, M.A., R.D.** Youngstown State University Youngstown, Ohio
3:30	Health Occupations Clinical Teacher Education Series for Secondary and Post Secondary Educators	**Mary Lou Shea, Ph.D.** Allied Health and Public Services Triton College River Grove, Illinois
3:50	Planning for the Future: An Interdisciplinary Approach Within a Division of Allied Health	**Carole Dyer** Mercy College of Detroit Detroit, Michigan
4:10	Symposium Closure	
4:15	Meeting of Collaborative Research in Allied Health Consortium	

POSTER SESSIONS

Quantitation of Somatomedin-C (SM-C): A Possible Marker of Gains in Body Weight (BWT) and Lean Body Mass (LBM)	Kory M. Ward, M.S., MT(ASCP) School of Allied Medical Professions The Ohio State University Columbus, Ohio
Weekly Interdisciplinary Patient Care Rounds	Nancy R. Wuggazer, R.N.,M.S. La Grange Memorial Hospital La Grange, Illinois
Health Risk Appraisal	Nancy Prendergast, Ed.D., OTR/L,FAOTA School of Allied Health Sciences Augusta, Georgia
A Study of Bioprosthetic Heart Valves Recovered from Humans	Delmas J. Allen, Ph.D. College of Health Sciences Georgia State University Atlanta, Georgia
Reliability of Isokinetic Endurance Tests	Jessie M. Van Swearingen, M.S., P.T. Program in Physical Therapy University of Pittsburgh Pittsburgh, Pennsylvania
Functional Capacity of Patients Prior to and after Bone Marrow Transplant	Lucinda Pfalzer, M.A.,P.T. School of Health Sciences The University of Michigan-Flint Flint, Michigan
Measurement of Oxidation Reduction Potential and Conductivity of Human Lymphocytes Following Binding by Antibody	Robert Harr, M.S. MT(ASCP) Department of Medical Technology Bowling Green State University Bowling Green, Ohio

SYMPOSIUM PLANNING COMMITTEE

John R. Snyder, Ph.D., MT(ASCP)SH, Chair
Philip D. Beckley, M.S., CPT, CCT
Marjorie L. Brunner, M.S., MT(ASCP)
Merida L. Johns, M.P.S., RRA
M. Rosita Schiller, Ph.D., RD

School of Allied Medical Professions
The Ohio State University
Columbus, Ohio

RESEARCH AWARDS

Awards were presented by Dr. John Snyder to:

GAYLE HERSCH, M.S., OTR AND ELAINE KORBA, M.S., RPT	Attitudes Toward and Knowledge of the Older Adult: A Survey of Prospective Health Care Professionals
ERIC BOTTJEN, M.S., P.T. SCOTT CHAVEZ, CLAIRE PARKER, AND MARIA NAGEL	Determining Research Needs in a School of Allied Health Professions
L. GEORGE VAN SON, ED.D. SUSAN PRITCHARD BEILEY, M.B.A., R.R.A.	Establishing a Data Base for Intrainstitutional Research in the Allied Health Professions

Three abstracts were selected to receive research awards. Recognition plaques were given to the above named presenters prior to the Keynote Address. Award decisions were based on the following criteria:

1. The abstract clearly demonstrated a research effort which was interdisciplinary and/or interinstitutional in nature.

2. The presentation associated with this abstract would be of interest to an interdisciplinary allied health audience.

3. The abstract stated the purpose of the study, methodology employed, main findings and principle conclusions.

4. The abstract was clearly written, organized and concise.

5. The presentation associated with this abstract would encourage and stimulate research on both a faculty and graduate student level.

THE KEYNOTE ADDRESS

Dr. DeWitt Baldwin, of The American Medical Association, presented the Keynote Address titled, Collaborative Research - Some Lessons From the Tower of Babel. In this paper, Dr. Baldwin draws an analogy between the biblical Tower of Babel and collaborative research. Both the Babylonians and collaborative researchers represent diverse peoples working toward a common end through collaborative effort. Dr. Baldwin notes that collaboration is a *pathway* -- *not an end*, but a *means*, to find answers to complex and unresolved questions. Speaking a common language and working collaboratively, we accomplish great things.

COLLABORATIVE RESEARCH - SOME LESSONS FROM THE TOWER OF BABEL

Dewitt C. Baldwin, Jr., M.D.
Director of Education Research
American Medical Association

The mythical story of the Tower of Babel as given in Genesis 11:1-9 appears to be an attempt to explain the existence of diverse human languages. According to the Bible, the Babylonians wanted to make a name for themselves by building a mighty tower "with its top in the heavens." God, beholding this, concluded that with a single common language, mankind could do anything he wished, so He arranged to disrupt the work by so confusing the language of the workers that they could no longer understand one another. The Tower was never completed and people were dispersed over the face of the earth.

The myth was probably inspired by the Tower Temple, north of the Marduk Temple, which, in Babylonian, was called Bab-il or Bab-ilu ("Gate of God; Hebrew form, Babel or Bavel). The similarity in pronunciation of the words Babel and Balal (to confuse) led to the play on words in Genesis 11:9 which reads "Therefore, its name was called Babel, because there the Lord confused the language of all the earth."

While the story of the Tower of Babel is obviously an attempt to explain the diversity of mankind and the omnipotence of the deity, as well as His judgment concerning mankind's iniquities, the story does suggest an interesting metaphor for the topic at hand. On the one hand, we have the high desire of a group of people to build a great monument through collaborative effort. In the end, however, this may be confounded by differences in language which make it impossible for them to effectively communicate and work together. What an intriguing metaphor for collaborative research!

Certainly, the research questions of today appear to call for ever increasing and specialized skills in their solution. And, in the American tradition of "bigger is better," modern research teams are getting bigger and more expensive! I'm sure, for example, that if one took the trouble to measure it, one would find that the number of authors listed on current research papers far exceeds that of even a decade ago. In fact, I've seen recent papers in the New England Journal of Medicine that list as many as 20 authors in an effort ot include and credit the entire research team. It is amusing to speculate if there will come a time when the number of authors exceeds the length of the paper!

Some years ago, there was a profile piece in the New Yorker Magazine on I.I. Rabi, the Nobel Prize winning physicist at Columbia, whose first grant was the enormous sum of $8,000 which managed to support his research and his entire staff for a year. I also recall seeing a picture of Heisenberg's laboratory, where he made his own Nobel prize-winning observations. They were made on a wooden table with equipment which could have fitted into a suitcase. Far cry, indeed, from the modern, multi-disciplinary research laboratories and teams which attempt to resolve the questions currently at the frontiers of man's understanding. Indeed I have just heard of a biomedical research grant for $29 million to one institution and a friend stated that he had just gotten $2.5 million for "AIDS" research. I am afraid that one would have to begin to suspect that some research efforts today may be as much in the service of the ego as of science, and are characterized more by "dredging" than by expert fly-fishing. In that light, one should remember Luszki's (1958) admonition that "getting together is not a substitute for individual thinking." Indeed, a team is only valuable when it accomplishes the work more effectively than persons working alone.

In considering what I wanted to say about collaborative research, I thought first of talking about the philosophy, theory and methods of collaborative research. However, because so little has been written about the process of collaborative research, I decided to address this aspect. Finding relatively little to guide me, I fell back on looking up the definitions of "collaboration" and "team."

Collaborate - from the Latin cum (with) laborare (to labor) - to labor together:

1. to work jointly with others, especially in an intellectual or scientific endeavor;
2. to cooperate with or willingly assist an enemy of one's country, (read discipline?);
3. to cooperate with an agency or intrumentality with which one is not immediately connected, often in some economic or political effort, (as in professional isolation?)

Team - from the old English, Teon - to draw or pull:

1. Two or more draft animals harnessed to the same vehicle or implement, (I've often felt like that!);
2. A group of animals (like that, too!);
3. A number of persons associated together in work or activity;

Teamwork - Work done by several associates, with each doing a part, but all subordinating personal prominence to the efficiency of the whole.

I then attempted to run a Med-Line and Tel-Net search on the key words: collaborative, collaborative research, team, team research, interdisciplinary team research --- and came up with appallingly little. I am intrigued by this because I find it hard to believe that people haven't written on this subject before. My suspicion is that they just haven't published in the "right" journals. My own previous paper on this subject, called "The Team Approach to Team Research," written in 1980, unfortunately was published in a book not indexed in either library survey - a common experience for persons who publish in the borderlands of what commonly passes for "science." Incidently, the issue of where to publish is a real one - especially in interdisciplinary efforts - where despite protestations to the contrary, each discipline wants credit in its own journal.

Before going further, let me draw another distinction - that between collaborative research and research on collaboration. Both are needed - perhaps the latter even more than the former, if only to facilitate the effectiveness of our expanding collaborative research efforts. But they are quite different. Feiger and Schmitt (1979) at the University of Rochester, have written one of the few papers I know of on this subject.

To return to collaborative research, many of the problems currently facing medicine and science lie at the interfaces between the traditional disciplines. As the Sherif's have said, "Man does not arrange his problems or divide them neatly along lines laid down by academic disciplines." (p.71) Multiple problems with multiple causes require the efforts of workers with a variety of skills, training and theoretical backgrounds, thus creating the need for collaborative research teams. Such teams are usually viewed and operate as multidisciplinary teams, which work in a sequential or side-by-side fashion on highly specific problems or experiments, involving clearly defined tasks and roles. Theoretical and methodological issues usually have been predigested and predecided by the team leader(s) or principal investigator(s), and "process" issues, such as leadership, decision-making, role, task and conflict resolution are handled relatively easily and superficially within a prescribed, hierarchical framework.

These teams are not truly interdisciplinary, in the sense that there is no regular, scheduled, face-to-face interaction among team members, no clarifying negotiation or resolution in the service of new roles and relationships, or even of new knowledge or theory. Indeed, the word collaboration does not necessarily imply true interaction, but, rather, may be simply "co-action," in which the collaborating individuals contribute traditional disciplinary skills and efforts in a sequential fashion, arriving at a final solution, which appears additive rather than innovative.

By contrast, Luszki (1958) defines the true interdisciplinary team as "A group of persons who are trained in the use of different tools and concepts, among whom there is an organized division of labor around a common problem with each member using his own tools, with continuous intercommunication and re-examination of postulates in terms of the limitations provided by the work of other members, and often the group responsibility for the final product." (Underlining added.) In such an interdisciplinary research effort, the view of each discipline hopefully is modified and socialized to the point where new theory and methods are created or enhanced. The result is a submersion of competing territorial imperatives within the overriding goal and discipline of common effort. Such a process has been described as the "grounded theory" approach by Glaser and Straus (1967).

This being said there is no guarantee that simply putting together people of different disciplines will result in any enhancement of effort or result. Indeed, without a deliberate effort to break down the barriers and difficulties which arise in collaborative research, most such efforts will founder or fail to realize their true potential.

Barriers to Collaboration

While the problems and barriers which mitigate against the success of collaborative research deserve extensive discussion in their own right, I feel that the constraints of time leave me little choice but to list them. I am sure that most of you from academia or other bureaucratic settings are intimately familiar with them. Without regard to priority, then, they are:

Professionalism
Status/Power
Leadership styles
Categorical funding
Territoriality
Theoretical differences
Terminology/Language
Diffusion of identity
Dilution of authority
Competition
Redundancy of effort
Role diffusion
Role confusion
Role conflict
Legal constraints
Personality differences

As for the last one, I am tempted to say "Ego, Ego, Ego!", and let it go at that. But on a more scientific basis, there is good evidence that differences in personality characteristics and styles can and do interfere with effective teamwork. At the same time, Rubin (1975) warns that when interpersonal issues arise on teams, the problem often stems from lack of clarity and definition of goals, roles and tasks - a view corroborated by my experience. Finally, the more practical issues of schedules, academic acceptance and advancement, as well as monetary and professional rewards can vitiate the best intended collaborative efforts.

Given these problems, what are some of the (supposed) advantages of collaboration? First, interdisciplinary, collaborative research efforts provide for expanded capability. There are simply more skills, ideas and effort available for the solution of the problem; in short, a maximizing of resources. Second, there is expanded creativity. Broader viewpoints are available, enhanced by the collegial format and by collegial support. Equally important, there is a balancing of views which can lead to new ideas. Third, there is the potential for expanded impact and dissemination of results. At a personal level, working collaboratively can lead to a sense and realization of synergy - that marvelous, high octance feeling that comes with shared creativity - where the whole is more than the sum of its parts and there is geometric rather than arithmetic impact - where one can truly see "The Whole Elephant," to refer to the old metaphor of the blind men and the elephant. At a pragmatic level, this is how new theories and approaches, more fitted to our complex world, can emerge.

What then is the process of true interdisciplinary collaboration and how does one create it? First of all, we must recognize it, be aware of it, pay attention to it, foster it, and use it. Just putting people together doesn't make a team or ensure commitment. "I" does not easily become "we." Even a highly emotional commitment to an important mission does not produce effective collaboration. President Reagan's recent declaration of war on drugs will come to naught if there are not the right people and resources involved.

Since 1960, some 38 new medical schools have been started. I was privileged to be in the starting gate for three of them. At two, I was part of the original planning group. In each case, we started out with high ideals and enthusiasm. In my opinion, all of these ideals and efforts have gone down the tube. Five years after starting (in one case, more like one day!) these schools looked exactly like all the traditional schools they were meant to replace. Good will - and even good ideas - are not enough!

Second, we must learn to recognize the barriers to collaboration and accommodate for them, not to them. We must create conditions where "I's" and "Egos" can begin to move toward becoming "We's" and "Teams." The difference between a pick-up, sandlot football team and a professional one is a lot of planning, training and practice. The latter works 40 hours per week to play a two-hour game on Sunday, while most research and patient care teams probably "practice" less than one hour a week on team process.

Next, we need better theories and more research on small groups and teams - and on the process of collaboration. These should not be in psychology department laboratories with student subjects (measurable results, but largely meaningless applications.) We need more experiments on real life teams, which will tell us how real people act under real conditions.

We need to recognize and utilize the unique differences of the various disciplines, while tempering their professional and territorial imperatives. What is needed is a process by which the differences are effectively reconciled and channeled into new energy and ideas. As my friend Virginia Satir says "we meet on the basis of our similarities; we grow on the basis of our differences." Professional identity is an important, - no - essential element in collaborative research. Yet, if permitted to run wild - if not tamed, as in "The Little Prince" - it can destroy a team. However, professional identity also is a fragile and sensitive thing. Loss or subjugation usually leads to resistance or rebellion.

Despite my strong (and, several times, nearly fatal) preference for egalitarianism, I have reluctantly reached the conclusion that, like children, most people need lots of clarity and structure during the phase of growth that takes them from I to WE! This often means opening certain doors and temporarily closing others - gently, but firmly, especially at the beginning. Paradoxically, this is aimed at protecting the individual professional identities, while harnessing and socializing them into the collaborative process. During this phase, it is important that things move slowly and in an orderly, predictable fashion with no surprises. Assumptions and expectations need to be identified and challenged. Differences need to be confronted (artificially, if necessary) in a structured format of open, face-to-face discussion, which must be conducted without expectation of immediate resolution. For example, it is possible to structure training exercises to enhance participation and status of lower status members. This process helps to create the climate in which professional egoism can abate and creative brainstorming can take place, leading to an increased sense of participation and enthusiasm. All this builds a sense of unity and pride - a feeling of "We-ness" - which sets the stage for the later stresses and nitty-gritty work of the research.

The use of an outside consultant in this phase is often valuable. The objectivity of an outsider helps to create a perception of fairness and structure, to minimize power and status problems and to enhance participation. Irv Rubin's (1975) Team Development Modules are also useful, as are various descriptions of the Problem Solving Process. It is often difficult and may seem time-consuming to spend time on team process - to slow down, to go back to basics, but, as every coach will tell you, success is based on fundamentals.

Cooley (1956) has described the process thusly: "It is not to be supposed that the unity of the (collaborative research team) is one of harmony and love. It is always differentiated and usually a competitive unity, admitting of self-assertion and various appropriative passions; but these passions are socialized by (understanding and acceptance), and come, or tend to come under the discipline of the common (purpose)." (p. 23) Difficult as this may be on a single research team, today's massive inter-institutional or international research projects pose even new and more difficult problems. How does one collaborate between groups and institutions in differnt places - possibly even in different languages? Once again, I believe, by: 1) establishing clarity of purpose, roles and tasks, 2) structuring mechanisms for enhancing collaboration, and 3) creating effective patterns of face-to-face communication.

In closing, I would like to return to the metaphor of the Tower of Babel. You will recall that if mankind could speak a common language (communicate), they could build a tower (collaborate), that would reach the heavens (accomplish anything). So, the problem of collaboration is to overcome the differences, the barriers identified earlier. Given the Bible's pessimism and man's professional iniquities, this poses quite a problem. But let us recall - the original meaning of Babel was Bab-il or Bab-ilu - meaning Gate of God. So we are not meant too become gods! (Though some try!) Rather, we are meant to come closer to God. Collaboration is a pathway - a means, not an end. As I see it, you are on the right track!

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PART I

RESEARCH RELATED TO GLOBAL ISSUES IN ALLIED HEALTH

The Symposium included four presentations dealing with research on issues of a general nature:

Establishing a Data Base for Intrainstitutional Research

Determining Research Needs in a School of Allied Health Professions

Surveying Research Interests and Needs of Allied Health Educators

Collaborative Research Between the Allied Health Professional and Industry

ESTABLISHING A DATA BASE FOR INTRAINSTITUTIONAL RESEARCH IN THE ALLIED HEALTH PROFESSIONS

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ABSTRACT

As one of the consequences of the First Collaborative Research in Allied Health Symposium, held at Ohio State University in 1985, the authors surveyed the question of faculty interest in research within their own School of Allied Health Professions. Using a survey instrument revised from the original developed at Ohio State University and with the permission of the author, M. Rosita Schiller, Ph.D., Twenty-two faculty from the authors' school were asked questions related to research preparation and skills, involvement in research activities, collaborative research, the research environment within the school, and the research environment within Ithaca College.

The survey was mailed to each faculty and a return rate of seventy-five percent was obtained. Interest was expressed in all types of research effort; however, collaborative research was found to be most preferred. Twenty-one out of twenty-two faculty were willing to collaborate and about one third felt competent to take major responsibility in conducting research. Other significant findings reported on strengths and weaknesses in faculty research skills and perceived needs in the areas of consultation service, workshops on research, and self-instruction modules. A Likert scale was employed to survey faculty opinion regarding the research environment within both the school and the college as a whole.

Results of this survey were reported to the faculty and interest in forming a collaborative research group was generated. As a consequence of this survey, steps were taken to engage the school in a national survey as part of an interinstitutional collaborative study in the Allied Health Professions by Ohio State University and Ithaca College. Importance was given to establishing communication with administrators to facilitate both intra and interinstitutional collaborative research. Inter-institutional research is seen as being of major importance and interest in the future for colleges and universities with limited research resources and for the facilitation of maximum investigation of complex research questions and issues.

INTRODUCTION

Faculty in programs concerned with the prepartion of students for allied health professions may be at a disadvantage in their research endeavors. Often such faculty have a history of clinical work and academic teaching, rather than research. Junior faculty especially, often do not have the doctorate, and thus may not have the experience of conducting major research under the mentoring of an established researcher.

Another difficulty facing the would-be researcher on any faculty is finding appropriate and sufficient resources, whether human, financial, or physical, with which to explore his or her problem. If the resources are available to begin with (which is more questionable than ever these days), the researcher may not know where they are or how to acquire their services.

One way around both these difficulties of experience and resource-finding is through establishing collaborative research relationships with other faculty to share expertise, better utilize available resources, avoid duplicating expensive projects, and avoid making expensive mistakes.

This approach, however, is dependent upon determining the research interests and abilities of the individuals with whom our researcher might form collaborative relationships and discovering whether others might also be interested in the idea of collaborative research opportunities and the exchange of expertise.

Our problem, then, was to first find out whether other faculty in the School of Allied Health Professions, one of six Schools within Ithaca College, were also interested in the idea of collaborative research. Secondly, we wanted to know what research skills might be lacking among the faculty, the degree of current involvement in research by the faculty, and their assessment of the research environment both within the School of Allied Health Professions and within the College as a whole.

We revised a survey instrument originally developed by M. Rosita Schiller, Ph.D., of The Ohio State University for a study of the research interests of clinical dietitians[1]. The revised and expanded questionnaire was mailed to each of the faculty (29) in the School of Allied Health Professions. A return rate of 75% (22 responses) was obtained.

REVIEW OF THE LITERATURE

A search of the literature failed to disclose any previous investigations into the research interests of allied health faculty. Two studies of the attitudes of faculty were found. One, a profile of management faculty[2], determined faculty interest in teaching and research (the former was preferred). The second was a British study[3] of the change in faculty attitudes toward research from 1973-1983; it included an examination of the reasons for doing research, perceived pressures for doing research, who or what caused those pressures, the satisfaction respondents obtained from doing research, and the number of publications. Several studies on collaborative research between academicians and clinicians were found both in the education literature[4-8] and in the allied health and nursing literature[9-11].

METHODOLOGY

The study involved the use of a 22 question instrument consisting of five groups of questions. (See Appendix for a sample of the survey instrument.)

1. The **research preparation and skills** of the respondent: seven questions asking the respondent to assess his or her interests and skills as a principal investigator, co-author, or junior author (definitions were provided rather than actually using these terms). Respondents were asked to indicate types of studies (e.g. historical, clinical, survey, collaborative, etc.) in which they were interested, what research skills they believed they possessed, what continuing education activities whould be helpful to them, as well as three questions on their level of education and preparation for research activity.

2. The respondent's **involvement in research activity** during the previous two years: questions were designed to differentiate among activities as principal investigator and those as co-investigator and/or supportive author. The questions distinquished among several phases of research activity (proposal-writing, literature search, presentation, publication). One question asked for an average amount of time per week spent by the respondent on research-related activity, and whether this time was adequate.

3. The respondent's opinions on **collaborative research** using four parameters: within the respondent's discipline (either at Ithaca College or at another institution) and not within the discipline (again, either at Ithaca College or at another institution). One question asked respondents if they had engaged in collaborative research within the past two years. Another multi-part question asked whether certain given circumstances were identified by the respondent as obstacles to research (e.g. finding a collaborator with similar interests, communicating with a collaborators, the logistics of collaboration - secretarial support, setting up meetings - and attitude differences with a collaborator). At this point, respondents were given the opportunity to identify further potential obstacles.

4. The **research environment within the School of Allied Health Professions**: a seven-point Likert scale was used to compare positive and negative aspects of research support, reward for research, and computer accessibility.

5. The research environment within Ithaca College as a whole: a similar set of questions using the seven-point Likert scale.

Many questions, particularly in parts 1. and 2. above allowed the respondent to choose more than one response. For example, the question on types of research of interest to the respondent gave a list of types (historical, experimental, clinical, survey, education, and four types of collaborative research) and allowed the respondent to indicate an interest in more than one type.

RESULTS AND INTERPRETATION OF DATA

I. Research Preparation and Skills

Our first question asked respondents to determine in what research role they felt comfortable. Forty-one percent (41%) believed they possessed the interest and skills to be a principal investigator (defined as serving as an organizer and taking responsibility for proposal writing and implementation), 95% to be a co-investi-gator (helping design studies and assist with proposal writing) and 59% as assisting or junior author (defined as collecting data as requested by other investigators). It is important to note that only definitions of these three terms rather than the terms themselves were provided in order to reduce misinterpretation on the part of respondents. In later questions, the terms "principal investigator" and "co-investigator", and occassionally, "junior author" were used.

Chart I shows the response to the question, "What are your research interests?" (question 2). Respondents were able to select more than one interest. It is striking that 95% of the respondents expressed an interest in collaborative research. This compares with 83.8% in Schiller's study[1]. Given an opportunity to select collaborative research in four configurations, more than 50% of respondents selected clinical and experimental studies (Chart I).

A majority of respondents were interested in any type of colaboration, with a very high interest in collaboration within the discipline.

A question (again offering multiple selections) asking the respondent for an assessment of his or her research skills (question 3) showed that respondents believed themselves to be most competent in writing the paper or abstract (85.0%), presenting the paper (80.9%), and identifying research problems (77.3%). (As shown in Chart II.) Most needed skills were getting funded (77.3%), statistical analysis of data (68.2%) and getting the paper published (63.6%).

The fourth question asked what research-related continuing

CHART I

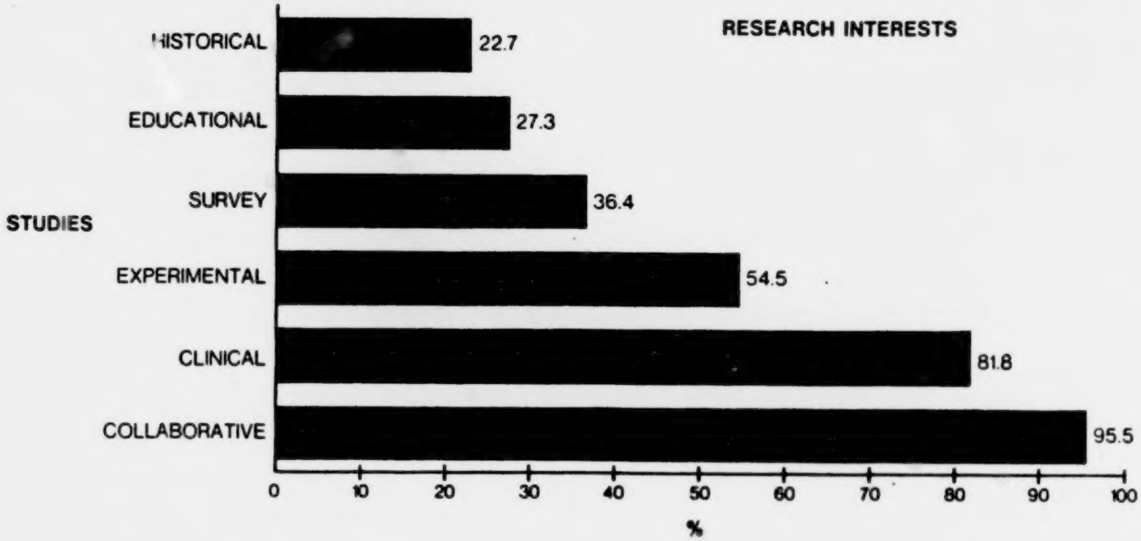
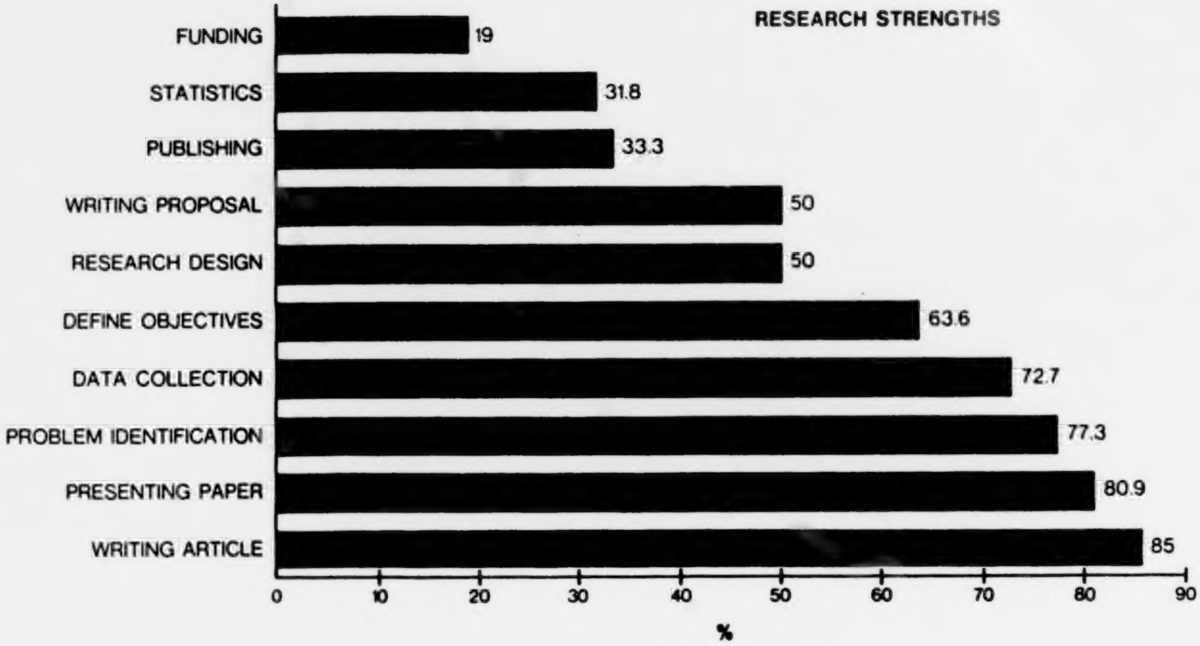


CHART II



education activities were of interest. Results are given in Table I. Again, respondents could give more than one response.

TABLE I
RESEARCH-RELATED CONTINUING EDUCATION OF INTEREST TO RESPONDENTS

	Number Selecting n-22	% Selecting
Correspondence course in Research Fundamentals	2	9.1%
Workshops	13	59.1%
Self-instructional module	11	50.0%
Consultation services to assist with writing proposals/papers	16	72.7%
Academic course	3	13.6%
Other (consultation with statistics)	1	4.5%

These results suggest that consultation services is a preferred method of providing continuing education in research methods.

Three questions to determine respondent's educational background are summarized in Table II.

TABLE II
PREPARATION FOR RESEARCH ACTIVITY

	Number Selecting	% Selecting
Highest Level of Education		
Bachelor of Science Degree	2	9.1%
Masters Degree in Progress	3	13.6%
Masters Degree Completed	8	36.4%
Doctorate in Progress	3	13.6%
Doctorate Completed	6	27.3%
Research-Related Courses Completed		
One or more Undergraduate courses in Statistics	15	68.1%
One or more Graduate courses in Statistics	14	63.6%
One or more Undergraduate courses in Research Method	9	40.9%
One or more Graduate courses in Research Method	16	72.7%
None	1	4.5%

TABLE II
PREPARATION FOR RESEARCH ACTIVITY (CONT.)

Research Experience During Formal Education

Undergraduate research project	11	50.0%
Masters Thesis	6	27.3%
Masters "Project" (non-thesis)	9	40.9%
Internship research project	3	13.6%
Doctoral Dissertation	9	40.9%
Other	5	22.7%
None	1	4.5%

Over three-quarters (77.3%) of the faculty had at least completed the masters degree at the time of the survey. During their formal education, all respondents but one had had some instruction in statistics (68.1% at the undergraduate level and 63.6% at the graduate level) and in research method (40.9% at the undergraduate level and 72.7% at the graduate level). This suggests that several faculty did not have a combined statistics/ research method preparation at the graduate level.

The question of research experience during formal education showed that again, all but one respondent had had some research experience. However, traditional major research activity (thesis or dissertation) had only been engaged in by 27.3% and 40.9% respectively.

These results suggest that it cannot be assumed that an allied health faculty member has had the traditional preparation for research of the doctorate with dissertation. Compared with many disciplines (e.g. biology or chemistry, to take just two examples) allied health faculty may be expected, as our hypothesis suggested, to engage in research without necessarily having a strong preparation under the mentoring of an experienced researcher or research-oriented graduate committee.

II. Research Involvment and Productivity

How involved were our respondents in research activity at the time of the survey (question 8)? Twenty respondents spent a total of 68 hours per week in research-related activity, for an average of 3.4 hours per week per person. One respondent indicated "not applicable" and one did not answer this question. We assume, therefore, that 90.1% of our respondents believed themselves engaged in research-related activity to the extent they could respond to this question. A majority (61.9%) wished to increase the time they spent in research activities (question 9), and 38.0% felt the time spent was adequate. No respondent indicated that less time was preferred. (Again, one respondent indicated this question was "not applicable".)

Our next six question (10-16) asked respondents about their productivity as researchers. A time frame of two years previous to the present survey was selected. These results are summarized in Table III. In all instances activity as principal investigator or first author equaled or exceeded that as co-investigator or supportive author. It is interesting to note that instances of the respondents providing assistance (either generally as participants or in the literature survey) without recognition as an author or co-investigator were infrequent.

Productivity as measured by number of articles published or accepted for publication as principal investigator or first author averaged one per faculty. These numbers should be considered in light of the fact that Ithaca College as a whole positions itself as a teaching rather than a research instituion. Nevertheless, productivity measured by publication is not particularly high. The same can be stated regarding presentations. Only 1.67 major presentations or symposia per faculty, on the average, were given or participated in during the two year period.

TABLE III
INVOLVEMENT IN RESEARCH ACTIVITIES

	Number	Average per respondent
Number of research projects participated in since 1983 (question (10); n=19:		
As principal investigator	25	1.31
As co-investigator	20	1.05
As collector of data for other investigators	3	.16
Number of research proposals or articles for which the current literature was surveyed (question 11); n=19:		
As principal investigator or first author	26	1.36
As co-investigator or co-author	26	1.36
Assisted but not listed as author	2	.11

TABLE III
INVOLVEMENT IN RESEARCH ACTIVITIES (CONT.)

	Number	Average per respondent
Research proposals written (question 12); n=21		
As principal investigator or first author	20	.95
As co-investigator or supportive author	13	.62
Of these written proposals, how many resulted in publication and/or presentation? (question 13); n=19		
As principal investigator or first author	7	.37
As co-investigator or supportive author	7	.37
In progress	3	.20
Number of presentations at national or state meetings or conferences (question 14); n=18		
Symposium/major session non-research	20	1.11
Major scientific/research paper	10	.56
Poster Session	1	.06
Case Study/Brief Presentation	4	.22
Round Table/Panel	8	.44
Other	3	.17
Number of articles published (or accepted for publication) as primary or supporting another (question 15); n=16		
As principal investigator or first author	16	1.00
As co-investigator or supportive author	3	.19
In progress	3	.19

Hoping to see if other research-related publication such as abstracts or review of published research had engaged our faculty, only three of 21 respondents (14.3%) had been productive in this area; however, these three had been quite busy, producing 6.33 such publications each, on the average, during the two-year period.

III. Collaborative Research

Three questions (17-19) involved collaborative research, again across four configurations:

1) within the discipline, at Ithaca College
2) within the discipline, at another institution
3) not within the discipline, at Ithaca College
4) not within the discipline at another instituion

Chart III shows the response to the question "Have you engaged in collaborative research since September 1983?" Our time frame again being the previous two years. As shown in Chart IV, those engaged in collaborative research are more likely to be collaborating within their discipline, and more likely still to contain that collaboration within Ithaca College.

The results of these two questions are corraborated by the response to question 19, shown in Chart V. Logistics (defined by examples such as setting up meetings and finding secretarial support) was given as the biggest obstacle to collaborative research in all four configurations. Finding a collaborator, as might be expected, was seen as a greater obstacle as one moved outside the discipline and outside the institution. A similar situation was found with communication with a collaborator (such as agreement on hypothesis, design or analysis of data) although as a whole, this was seen as the least obstructive of the obstacles suggested. Attitude differences with a collaborator (such as a differing degree to which each wishes to engage in research and basic philosophical differences) while not seen as great an obstacle as logistics, varied the least across the four configurations.

Question 20 showed that just over half (54.5%) of the respondents were involved in a research project not yet submitted for publication. Again, it must be kept in mind that Ithaca College's mission emphasizes teaching over research.

IV. Research environment within the School of Allied Health Professions and within Ithaca College

The last two questions (21 and 22) presented respondents with a seven point Likert scale describing the research environment within the School of Allied Health Professions and within the College as a whole. The results are simply displayed in Chart VI as means withing the 1-7 range of possible responses. It should be noted that some respondents did not answer, or had difficulty with these two questions. For this reason, a more exhaustive analysis of results was not attempted, nor is there an attempt here for more than a rudimentary interpretation of results. Given that an answer of "1" was the most positive response, computer accessibility was, in this analysis, the most

CHART III

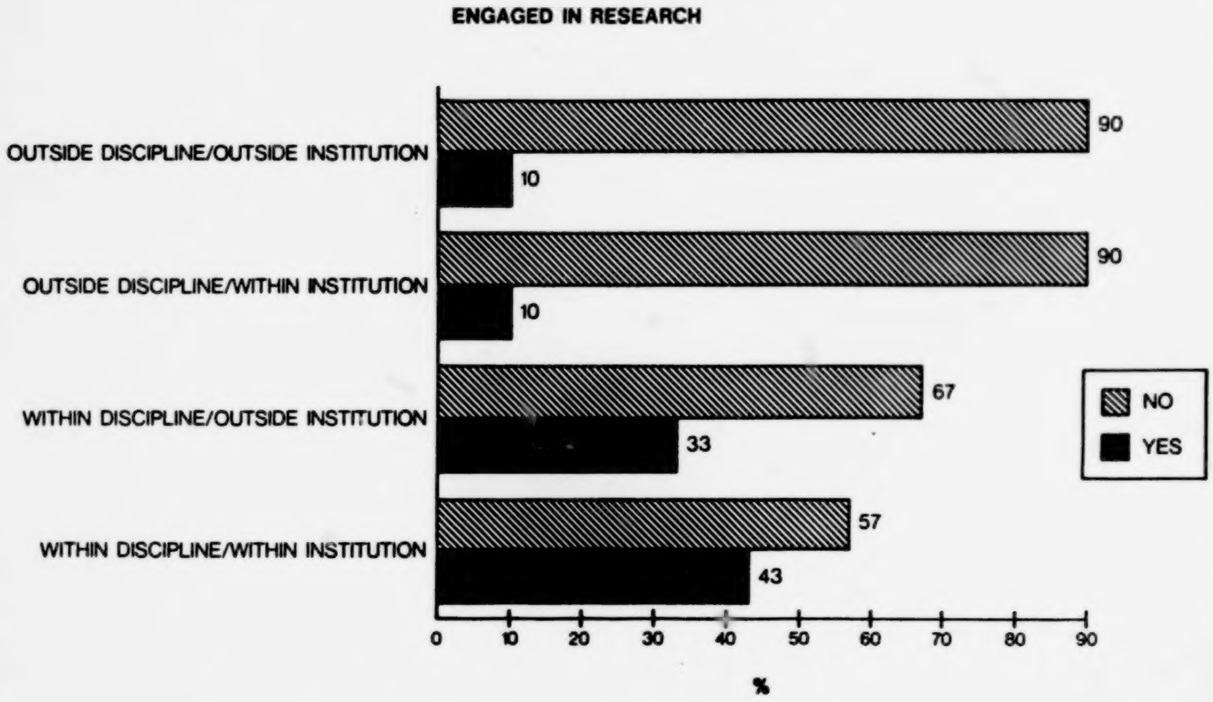


CHART VI

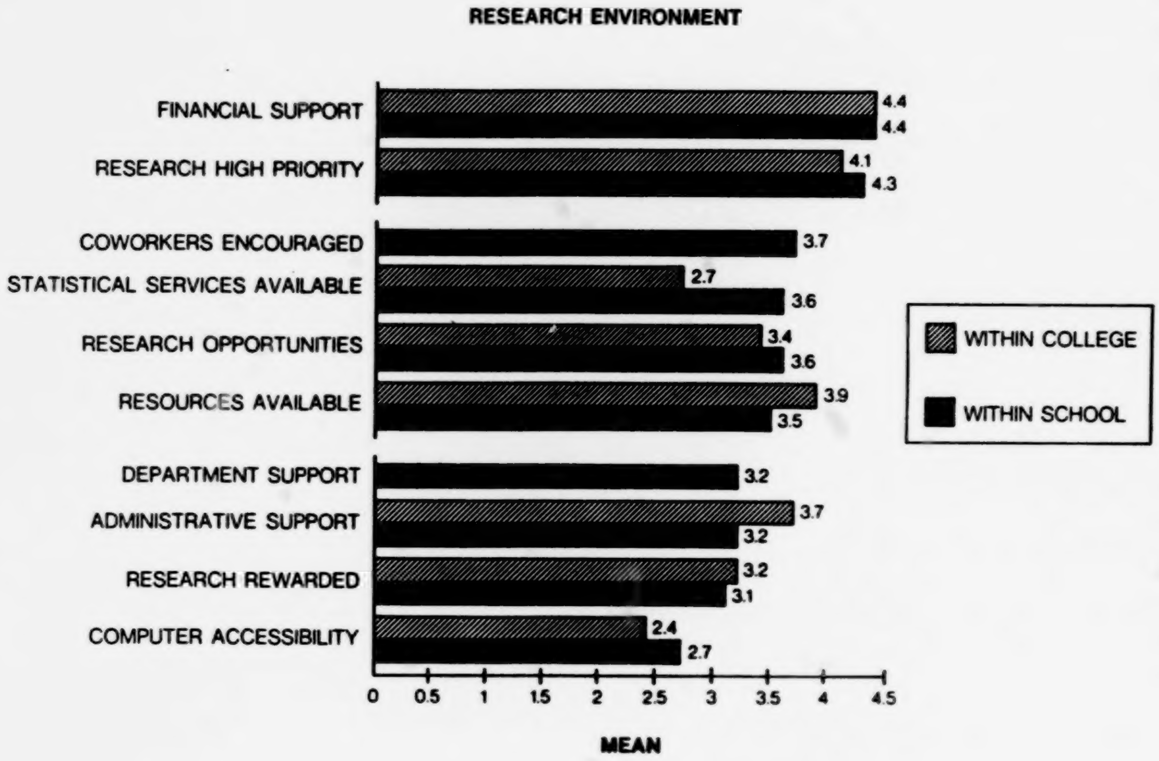
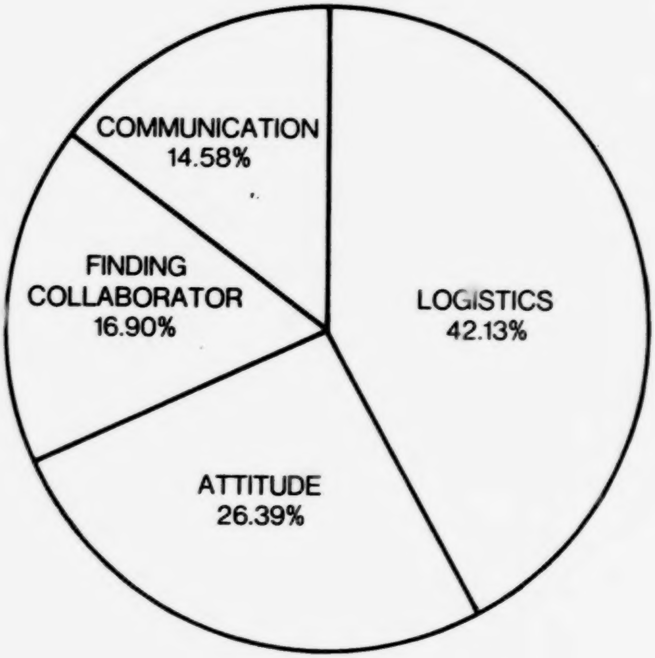


CHART V

OBSTACLES



positive aspect of the research environment in both the School and the College. Financial support appeared as the most negative aspect in both School and College although even here the mean response was 4.4 (in a range of 1-7) in both environments.

SUMMARY AND RECOMMENDATIONS

In summary, nearly all respondents (95.0%) based on a 75% response rate) in a survey of research interests of allied health faculty, organized in a School of Allied Health Professions, at one institution indicated an interest in collaborative research. Formal preparation of the allied health faculty at this institution is not as likely to be of the doctorate-with-dissertation level as some other disciplines. Allied health faculty indicated that consultative services to assist in ameliorating weaknesses in research ability, such as obtaining funding and in statistical analysis of data, would be of greatest interest as continuing education activity. While research productivity, in a college where teaching is encouraged over research, is not particularly high, a little over half the respondents were engaged in research projects not yet submitted for publication. As might be expected, respondents were most interested in collaborative research within their own disciplines and within their own institution. Logistics, such as arranging meetings and finding secretarial support, were seen as the major obstacles to collaborative research, among the four obstacles provided for in the survey instrument. Respondents in general gave a positive response to questions regarding several parameters indicating research environment first, within the School of Allied Health Professions, and second, within the institution as a whole.

For the School and the College, the survey provided several suggestions for ways in which research-related activity might be fostered among allied health faculty by using collaborative efforts between and among faculty, and by providing support through faculty development activity.

Based upon this data, it could be beneficial to establish an in-house research support committee composed of faculty who responded to this questionnaire. In fact, a move toward the development of such a group has been made. Future steps might be to seek collaborative resources off campus with institutions which express a desire to share personnel and resources and to encourage College and School support for faculty development support in statistical analysis techniques and grantsmanship. Another step might be to establish a group of faculty consultants within the School who are willing to share their various research skills. This might encourage those with less experience or self confidence to engage in research, provide a supportive environment for collaboration and increase research productivity across the School. Collaborative research, especially between institutions is seen as being one way for colleges and universities with limited resources to encourage research activity. This approach; however, is dependent upon the interests and abilities of individuals within any given institution. This study describes how these interests and activities might be determined by a survey instrument.

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DETERMINING RESEARCH NEEDS IN A SCHOOL OF ALLIED HEALTH PROFESSIONS

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ABSTRACT

The purpose of this study was to examine the present level of research activity, the level of research knowledge, and future needs for collaborative research activities within the School of Allied Health Professions (SAHP) at the University of Nebraska Medical Center.

METHODOLOGY: A forced-choice questionnaire was mailed to 133 allied health faculty members. In analyzing data from the 49 respondents (37%), both total responses and full-time faculty responses were used.

FINDINGS: Ninety-two percent of all respondents agreed that a need existed for faculty development seminars on research, and that 82% would be able to attend. Approximately 85% of full-time faculty agreed that research at both faculty and student levels should be emphasized, and 88% supported the concept of a student research forum. Nearly 40% of full-time faculty indicated that students in their programs currently are required to perform research and/or take an introductory course in research methodolgies. More than 82% of the same group indicated that an interdepartmental course in research methodologies should be available. Approximately 60% of all faculty indicated that they could engage in research, and 50% would be able to act as advisors for student research.

CONCLUSIONS: We are presently developing a syllabus for a series of research seminars for faculty development, to be offered in the Fall 1986. An introductory course on research methodologies is also being designed for all students in the School. Finally, we will be coordinating a student research forum during the school year 1988-89. Effectiveness of these efforts will be carefully evaluated.

INTRODUCTION

In most university or post-secondary educational health care institutions, the triad of teaching, patient care and research exists. For faculty within those institutions, the first two, teaching and patient care, are easily attainable. However the latter, is not. The reasons why research is not easily attainable is multifaceted ranging from funding to exact knowledge of research methods.

Research endeavors are even more difficult for faculty members with The School of Allied Health Professions. Yet that specific requirement is necessary for promotion and tenure within the college of medicine and for respective school of allied health professions.[1]

Because of the importance placed on research by allied health faculty members, the need for cooperation between various allied health educational units is a necessity. McCallum has addressed this issue of cooperation, communication and multidisciplinary approach to research within dental schools.[2] Gross also notes that faculty members can enrich their "intellectual lives" with contact through other colleages via seminars and other developmental programs.[3]

Therefore the purpose of this study was to investigate if an interest existed by both alllied health faculty and students for multidisciplinary research, and if a multidisciplinary research course for allied health students would be a welcome curriculum addition.

METHODS

For this study, a 19 item forced choice questionnaire (Appendix A) was mailed to all individuals holding a faculty appointment in the School of Allied Health Professions at The University of Nebraska Medical Center. Faculty appointment was defined as those having a rank of assistant instructor and above. The questionnaire was a Likert-type scale where response "A" represented "strongly agree" and response "D" represented "strongly disagree." Item 20 on the questionnaire was open-ended to query respondents' current research efforts. There were no identities for the respondent, however the questionnaire was color coded by Division or Program.

Results of the questionnaire were tabulated using a frequency count for each statement. Percent agreement for each statement was also determined. The frequency count along with the percent agreement was contrasted for all responding faculty members versus those with a full appointment.

RESULTS

Completed questionnaires were received from 49 faculty members, a 37% return. (See Table 1.) Patterns of responses for each statement are detailed in Table 2, and summarized in Table 3.

TABLE I
Demographic Characteristics of Survey Respondents (N-49)

Programs	**Respondents**
Bio-Medical Communications	3
Medical Nutrition Education	2
Medical Technician	12
Nuclear Medicine Technician	2
Physical Therapy Education	18
Physician Assistant	10
Radiology Therapy	1
Radiologic Technician	1
Rank of Respondents	
Assistant Instructors	8
Instructors	29
Assistant Professors	10
Associate Professors	2
Status of Respondents	
Full Time	17
Courtesy	19
Volunteer	13

TABLE II
Faculty Responses to the Research Questionnaire (N-49)

Statement	Strongly Agree	Agree	Strongly Disagree	Disagree	NA
1.Faculty development seminars on research are needed.	36.7%	55.2%	6.1%	2.0%	.0%
2.I would attend development seminars on research.	28.6%	46.9%	14.3%	2.0%	8.2%
3.The School of Allied Health should emphasize research at the faculty level.	24.5%	67.4%	6.1%	2.0%	0.0%
4.The School of Allied Health should emphasize research at the student level.	16.3%	65.4%	12.2%	4.1%	2.0%
5.Research endeavors are necessary for the survival of the School of Allied Health Professions.	22.4%	59.3%	10.2%	2.0%	6.1%
6.Annual research forum for Allied Health students would be a valua-able experience.	24.5%	63.3%	4.1%	2.0%	6.1%
7.PRESENTLY, the students in our program perform research.	10.2%	26.5%	24.5%	18.4%	0.4%
8.PRESENTLY, the students in our program take an introductory course on research methodologies.	10.2%	18.4%	22.4%	20.4%	28.6%

TABLE II (CONT.)
Faculty Responses to the Research Questionnarire (N-49)

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	NA
9.There should be an interdepartmental course on research methodologies available to all students in the School of Allied Health Professions.	26.5%	61.2%	8.2%	4.1%	0.0%
10.The students in our program should know how to perform research.	30.6%	59.2%	8.2%	2.0%	0.0%
11.The students in our program should perform research.	16.3%	49.1%	22.4%	6.1%	6.1%
12.I have a need to perform research.	16.4%	34.7%	34.7%	6.1%	8.1%
13.The students in our program have time (2 hours/week) for a class on research.	10.2%	36.8%	12.2%	14.3%	26.5%
14.Our program would provide computer support to assist in research.	14.3%	36.7%	14.3%	2.0%	32.7%
15.There is clerical support within our program to assist in research.	2.0%	18.4%	36.7%	18.4%	24.5%
16.Financial support exists within our department for research projects.	2.0%	34.7%	22.4%	10.2%	30.7%
17.Equipment exists within our department which is available for research projects.	6.1%	51.0%	22.4%	4.1%	16.4%

TABLE II
Faculty Responses to the Research Questionnaire (N=49)

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	NA
18. I am involved in too many other activities to engage in research projects.	10.2%	36.7%	40.8%	8.2%	4.1%
19. I am involved in too many other activities to advise student research projects.	12.2%	26.5%	45.0%	10.2%	6.1%

TABLE III
Contrast of Full-time to Total Faculty Agreement on Research Statements

		% Faculty Agreement	
		Full-time	Total
1.	Faculty developmental seminars.	100.0	91.9
2.	Faculty attendance at developmental seminars.	94.1	75.5
3.	Emphasize research at the faculty level.	88.2	91.9
4.	Emphasize research at the student level.	82.3	81.7
5.	Research endeavors are necessary.	76.4	81.7
6.	Annual research forum for Allied Health students.	88.2	87.8
7.	PRESENTLY, our students perform research.	41.1	36.7
8.	PRESENTLY, students take intro to research.	35.2	28.6
9.	Availability of interdepartmental research course.	82.3	87.7
10.	Students should know how to perform research.	88.2	89.8
11.	Students should perform research.	53.0	65.4
12.	Faculty need to perform research.	70.6	51.1
13.	Students have time for a research class.	53.0	47.0
14.	Computer support is available.	58.8	51.0
15.	Clerical support is available.	17.6	20.4
16.	Financial support exists.	47.2	36.7

		% Faculty Agreement	
		Full-time	Total
17.	Equipment is available.	58.8	57.1
18.	Faculty too involved to do research.	29.3	46.9
19.	Faculty too involved to advise students.	29.3	38.7

Statements can be categorized around to three factors. These factors include 1) faculty perception of research needs; 2) faculty perception of student research needs; and 3) faculty perception of potential research problems. Factor one consisted of statements 1, 2, 3, 12 and 18. Factor two consisted of statements 4, 6, 7, 8, 9, 10, 11, and 13. Factor three consisted of the remaining statements. Entry number 20 identified the number and topics of research projects currently underway by School of Allied Health Professions' faculty.

For factor one, the percent of agreement ranged from a high of 91.9% to a low of 49.0% with an average of 69.1%. The percent of disagreement ranged from a high of 46.9% to a low of 8.1% with an average of 26.5%. It is interesting to note that statements #12 and #18 which focus on personal involvement in other activities show a nearly even distribution of agreement and disagreement, yet responses to statement #19 indicate that the respondents are willing to act as advisors to student researchers.

For factor two, faculty support of student research, the percent of agreement ranged from a high of 89.9% to a low of 42.8%, with an average of 78.0%. The percent of disagreement ranged from a high of 28.6% to a low of 6.1%, with an average of 16.7%. Statement #8, which focuses on the present level of research methodologies being taught in the School of Allied Health Professions, indicates that fewer than half of the faculty report that their students are currently taking a research course. Statement #9, however, shows strong support for the concept of the availability of an interdepartmental course on research methodologies.

For factor three, faculty perceptions of clerical and material support for research endeavors, the percent of agreement ranged from 81.7% to 20.4%, with an average of 50.3%. The percent of disagreement ranged from a high of 55.1% to a low of 12.2%, with an average of 29.3%. For the eight statements in factor three, the percent of "not applicable" was relatively high, with a maximum of 32.7% and a low of 6.1%. This was to be expected, since not all faculty could make definitive responses regarding their department's financial, clerical and material support of research.

Overall, both factors one and two received strong support from the faculty indicating their interest in faculty developmental seminars and an interdepartmental research course for students. Only weak support was indicated for the underlying services necessary for the carrying out of research projects. These results appear to indicate ambivalence in total support for the introduction and maintainence of a research module in the School of Allied Health Professions.

CONCLUSIONS - FACULTY ISSUES

Conclusions based on the results are divided into Faculty and Student Issues although some overlap does occur. The issues agreed upon were judged as those receiving greater than 50% agreement by both full time and all faculty responding.

There was agreement that the faculty need to perform research and that it is necessary for the survival of the School of Allied Health Professions. Agreement on these items was probably due, in part, to the Medical Center's emphasis on research and its contribution toward promotion and tenure. Even though some faculty already perform research, there was sufficient information to conclude that only a few faculty perform the bulk of the research in Allied Health. A question not asked but which would have been useful was whether or not the respondent was on a tenure track.

Responses indicated that the faculty is interested in attending developmental seminars on research. The majority of the faculty are willing to serve as research advisors to students and feel there is sufficient equipment and computer support for research within their program.

Financial support for research was not felt to be adequate by the majority of faculty. In addition, the majority did not feel they had sufficient time to conduct research because of other commitments.

STUDENT ISSUES

Faculty responses to student research issues found that the majority of students are not presently involved in research. Nor do they take an introductory research course. However, it was felt that an interdisciplinary course offering on research is desirable. The results affirmed sponsoring an annual allied health research forum for students. Also, the faculty agreed that students should know how to perform research but were undecided on whether actual performance is necessary.

POTENTIAL PROBLEMS

Two potential problems identified: 1) faculty felt there is insufficient clerical support; and 2) students may not have adequate time in their schedules for a research course. The clerical support problem was felt to be significant but one which could overcome by hiring temporary help or relegating school finances as needed. Scheduling the introductory research course could be addressed by offering the course both Fall and Spring semesters and at night if necessary to accommodate the majority of students.

RECOMMENDATIONS

In response to the survey, several recommendations were made to the Associate Dean of the School of Allied Health Professions. The first recommendation was to develop a standing committee on research within the school. By creating a standing rather than ad hoc committee on research, the School would be promoting and supporting the concept of creative and scholarly activity of its faculty.

The remaining recommendations refer to the work of the committee. The current ad hoc committee chose to address these by determining the areas which were the most needed and the time necessary to develop a specific recommendation. Guidelines, policies and procedures would be necessary for the committee as it progresses and will be written as the work develops.

A monthly lecture series was originally planned for faculty to attend where different speakers would present various topics, such as identifying the research questions, statistical methods, and publishing the results. However, after discussing the option with potential speakers, it was felt that continuity would be lacking. It was also argued that a supportive environment for research would be fostered by this approach. Therefore the thrust was changed to colloquia. The intent of the colloquia is to stimulate a cohesiveness among the faculty, a desire to perform research, and willingness to share experiences with colleagues. The first faculty development colloquium was presented at this Fall's general faculty meeting for the School. Future colloquia will include researchers who present their studies focusing their discussion on one paricular aspect, such as reviewing the literature, selecting the correct statistical tool or developing the research problem.

An interdisciplinary course is being developed for two semester hours credit. It remains undecided whether the course will meet twice, one hour each time or once for two hours each week. The course is planned to be offered the first time in Fall 1987. The following preliminary topic outline will be implemented:

Week #1	Introduction, Myths/Fears of Research, Definitions/Types
Week #2	Ethics
Week #3	Safety Literature Review
Week #4,5,6	Research Designs
Week #7,8	Statistics

Week #9	Mid-term Examination Research Proposal
Week #10	Quality Assurance Instrumentation
Week #11	Critical Reading/Writing
Week #12	Computers
Week #13	Grants/Grants Writing
Week #14,15	Student Article Analysis
Week #16	Final Examination

The course is envisioned to have different speakers for each segment with an overall course coordinator who will attend all lectures and compile exams. The survey statement which received equivocal agreement concerning whether students should perform research will be handled as follows: the introductory course will be a how-to course and each program will have the option to offer an additional course in performing research.

A research forum is forecasted for the Spring of 1988 primarily for allied health faculty and students. This extended time will give both groups an opportunity to develop and finish research projects.

A newsletter is planned but no decisions have been made regarding content, frequency or format.

This study has been worthwhile for our School because it not only provided an opportunity to practice research techniques, but also to demonstrate the need for collaborative research activities.

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SURVEYING THE RESEARCH INTERESTS AND NEEDS OF ALLIED HEALTH EDUCATORS

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ABSTRACT

Allied health educators are faced with new expectations for conducting research studies. Informally, some faculty members express their inability to get started in research; others lack the support of coworkers who can encourage and collaborate with them. A review of the literature failed to cite any studies that documented the research interests and needs of allied health educators.

A national study was conducted to determine the research needs, skills, interests and productivity of allied health educators from the areas of dietetics, medical records, medical technology, nurse anesthesia, occupational therapy, perfusion technology, physical therapy, radiologic technology and respiratory therapy. The objectives of the study were to: (a) determine current research activities of allied health educators, (b) identify personal research interests of this group, (c) ascertain the need for collaborative research in the field, (d) characterize the research environment in allied health, and (e) identify continuing education needs required for research studies.

A survey questionnaire was developed consisting of four sections: demographics of the sample population, current involvement in research activities, individual research interests and needs, and the research environment of the institution. Questionnaires were mailed to 4,860 faculty members representing the nine professions listed earlier. Completed questionnaires were returned from 1,969 individuals. Results from statistical analysis provide data to: (a) document current research/scholarship involvement of allied health educators, (b) characterize the research environment of each profession, (c) compare and contrast the research environment of each profession, compare and contrast the research productivity and environment of the allied health profession, and (d) identify research needs and interests of these educators.

INTRODUCTION

The need for research[1] has been the subject of many editorials, letters and articles within numerous professional publications. With the changing roles and expectations of the various health practitioners and the fierce competition for the health care dollar, research is no longer a lofty goal but a necessity for validation of professional roles and practice.

As leaders of the various disciplines, allied health educators within academic settings are faced with the expectation of conducting research studies. While most allied health faculty are educationally prepared to be competent practitioners, many have little or no formal education in research methods. Informally, some faculty members express their inability to get started in research; others lack the support of coworkers who can encourage and collaborate with them.

With these concerns, a national study was conducted to determine the research needs, skills, interest, and productivity of allied health educators. The specialty areas surveyed were dietetics, medical record administration, medical technology, nurse anesthesia, occupational therapy, perfusion technology, physical therapy, radiologic technology and respiratory therapy. The objectives of the study were to:

1. Determine demographic characteristics of the population.

2. Determine current research activities of allied health educators.

3. Determine interest in collaborative research among the professions.

4. Identify continuing education needs required to perform research studies.

5. Characterize the research environment in allied health.

METHODOLOGY

Representatives of the nine allied health professions met to design a research project to identify the research interests and needs of allied health educators. A questionnaire was developed based upon an earlier survey of clinical dietitians and adapted with the permission of M. Rosita Schiller, Ph.D., R.D.. The questionnaire was divided into four sections. The first section involved demographic information such as academic rank, level of education, formal research experience, and type of sponsoring institution for the allied health programs. The second section identified the participant's involvement in research activities, such as the number of projects, grants, presentations, and publications. The third section pertained to research interests and needs of the allied health faculty members including their interest in collaborative research and the need for additional research skills or continuing education. The fourth section focused on the research environment and factors which help to promote research activity within the institution.

Letters were sent to the program directors of 2,034 institutions requesting the names of all regular, salaried faculty members who would agree to receive a questionnaire. Of the 2,034 letters sent, (Table 1) 1,131 (56%) returned the letters listing faculty who agreed to be surveyed. Program directors were requested not to list the names of clinical, or adjunct, non-salaried faculty members. As a result of the original inquiry, surveys were sent to 4,860 individuals with 1,969 (41%) surveys returned. A follow-up mailing was sent only to medical records administration and technology programs.

Responses from the completed survey instruments were entered into the computer using WYLBUR and the Statistical Package for the Social Sciences (SPSS). Frequency distributions and means were calculated, and the t-test was used to determine significant differences between groups.

FINDINGS

Demographic Characteristics

The respondents in this survey were a diversified group encompassing many levels of education in various settings. Demographic characteristics are listed in Table II. About 37% of the respondents had completed a master's degree, while only 19.1% had completed a doctorate. Approximately two-thirds of the group held an academic rank of instructor or assistant professor. One-third of the respondents were from major research universities but tenure did not apply to 41.9% of the group. Nearly 45% held a faculty position for over seven years, with a mean of 7.9 years. The majority of the programs offered a baccalaureate degree, but about 30% also offered a graduate program.

Fewer than 50% of the respondents had an undergraduate statistics course and/or research methods course and approximately 60% had graduate courses in statistics and/or research methodology (Table III). Almost 90% had some form of research experience at the undergraduate or graduate level, indicating prior research experience. Participation in research activity as a component of one's educational preparation for professional practice or teaching is not necessarily reflected in current involvement in research.

TABLE I

PROGRAMS AND INDIVIDUALS SURVEYED BY PROFESSION

Profession	Programs Contacted (N)	Programs Responding (N)	Programs Responding (%)	Surveys Mailed (N)	Surveys Returned (N)	Surveys Returned (%)	Percent of total
Dietetics	430	173	40	854	354	41	17.98
Medical Record Administration	141	103	73	350	192	55	9.75
Medical Technology	119	78	66	389	166	43	8.43
Nurse Anesthesia	111	71	64	481	188	39	9.55
Occupational Therapy	118	96	81	537	237	44	12.04
Perfusion Technology	27	15	56	63	26	41	1.32
Physical Therapy	104	80	77	593	271	46	13.76
Radiologic Technology	742	377	51	1,119	328	29	16.66
Respiratory Therapy	242	138	57	474	207	44	10.51
Totals	2,034	1,131	56	4,860	1,969	41	100.00

TABLE III
RESEARCH BACKGROUND OF SURVEY PARTICIPANTS

Item	Frequency	Percent
Preparation for research		
Undergraduate curriculum		
Statistic course(s)	884	48.9 %
Research methods course(s)	498	27.5 %
Graduate curriculum		
Statistic course(s)	1089	60.2 %
Research methods course(s)	1125	62.2 %
Other	135	7.5 %
Research experience		
Undergraduate research project	800	42.0 %
Masters Thesis	657	34.5 %
Masters Project (non-thesis)	572	30.0 %
Internship research project	190	10.0 %
Doctoral dissertation	459	24.1 %
Other research experience	168	8.8 %
No research experience	222	11.3 %

Involvement in Research Activities

About 38% of respondents spent no time in research, 31.4% spent one to four hours per week, while 14.6% spent over eight hours per week. The mean time spent for all educators was four hours per week (Table IV). The majority (76%) would prefer to spend more time in research activity.

TABLE IV
TIME ALLOCATED TO RESEARCH ACTIVITY

Item	Frequency	Percent
Time devoted to research per week		
0 hours	703	38.1 %
1 - 4 hours	579	31.4 %
5 - 8 hours	292	15.9 %
> 8 hours	270	14.6 %
Preference for research		
Spend less time in research	46	2.3 %
Spend more time in research	1265	76.0 %
Keep research time the same	347	20.9 %

Approximately 45% have never participated in a research project either as a principal or co-investigator; however, the majority have participated or authored at least one researach project as principal or co-investigator since 1980 (Table V). Perferred types of research include clinical and survey studies include clinical and survey studies (Table VI).

TABLE II
DEMOGRAPHIC CHARACTERISTICS OF SURVEY RESPONDENTS

Item	Frequency	Percent
Highest level of education		
Certificate	41	2.1 %
Associate	56	2.9 %
Bachelor of Science	267	13.6 %
Masters Degree in progress	218	11.1 %
Masters Degree completed	728	37.1 %
Doctorate in progress	261	13.3 %
Doctorate completed	375	19.1 %
Academic rank		
Instructor	683	34.9 %
Assistant Professor	605	30.9 %
Associate Professor	330	16.9 %
Professor	132	6.8 %
Other	205	10.5 %
Type of institution		
Hospital-based certificate program	239	12.3 %
2-year community/technical college	395	20.4 %
4-year liberal arts college	333	17.2 %
4-year professional college	349	18.0 %
4-year major research university	616	31.8 %
Tenure status		
Tenured	579	29.7 %
Non-tenured, but pursuing tenure	552	28.3 %
Tenure does not apply	817	41.9 %
Years in a faculty position		
0 - 3 years	518	26.5 %
4 - 7 years	571	29.3 %
> 7 years	863	44.2 %
Level of students taught		
Associate	641	32.7 %
Certificate	364	18.6 %
Baccalaureate	1220	62.3 %
Graduate	572	29.2 %
Other	78	4.0 %

TABLE V
RESEARCH INVOLVEMENT SINCE 1980

Participation in research projects as:

	PRINCIPAL INVESTIGATOR		CO-INVESTIGATOR	
Number	Frequency	Percent	Frequency	Percent
None	825	46.2 %	795	44.5 %
1	370	20.7 %	339	19.0 %
2	229	12.8 %	265	14.8 %
3	135	7.6 %	137	7.7 %
4 or more	227	12.7 %	251	14.0 %

Number of research proposals written as:

	PRINCIPAL INVESTIGATOR		CO-INVESTIGATOR	
Number	Frequency	Percent	Frequency	Percent
None	831	46.3 %	1063	63.2 %
1	358	21.2 %	263	15.6 %
2	186	11.0 %	143	8.5 %
3	100	5.9 %	94	5.6 %
4 or more	210	12.5 %	118	7.0 %

Research projects approved with funding as:

	PRINCIPAL INVESTIGATOR		CO-INVESTIGATOR	
Number	Frequency	Percent	Frequency	Percent
None	1129	70.9 %	1269	79.9 %
1	228	14.3 %	184	11.6 %
2	120	7.5 %	80	5.0 %
3	50	3.1 %	30	1.9 %
4 or more	66	4.1 %	26	1.6 %

Research projects approved without funding as:

	PRINCIPAL INVESTIGATOR		CO-INVESTIGATOR	
Number	Frequency	Percent	Frequency	Percent
None	1165	73.3 %	1287	81.1 %
1	251	15.8 %	156	9.8 %
2	97	6.1 %	63	4.0 %
3	35	2.2 %	25	1.6 %
4 or more	41	2.6 %	56	3.5 %

The majority of respondents (56.1%) participated in research with colleagues in their profession at their institution and only 11% perform research with colleagues outside of their discipline and institution (Table VI).

TABLE VI
RESEARCH ASSOCIATIONS AND AREAS OF INVESTIGATION

Item	Frequency	Percent
Type of research		
Clinical studies	741	45.1 %
Survey studies	723	44.0 %
Education studies	619	37.7 %
Experimental studies	509	31.0 %
Quasi-experimental studies	248	15.1 %
Historical studies	181	11.0 %
Other	110	6.7 %
Types of research associations		
Colleagues in your discipline at your institution	905	56.1 %
Colleagues in your discipline at another institution	372	23.0 %
Colleagues not in your discipline at your institution	431	26.7 %
Colleagues not in your discipline at another institution	177	11.0 %
No one	343	21.3 %

The majority of the individuals have never made a major presentation such as a resarch paper, poster session, abstract or panel discussion, at national or state conferences in the prior five years.

Similarly, the majority have not published a scientific paper; however, approximately one-third (30.4%) have been a primary author of one or more research publications in a refereed journal, while 24.4% have been a primary author of a non-research publication in a refereed journal (Table VII). In an attempt to increase productivity, many individuals were willing to collaborate with researchers having similar interests.

TABLE VII
PRESENTATIONS AND PUBLICATIONS

NUMBER OF PRESENTATIONS (PERCENT)

Item	None	1	2 or 3	4 or more
Major Session	62.4	12.4	13.2	12.1
Research Paper	74.1	9.0	9.4	7.5
Poster Session	77.7	8.9	7.7	5.7
Case Study/Abstract	76.0	11.1	8.9	4.0
Panel Discussion	75.6	12.4	8.9	3.1

TABLE VII (CONT.)
PRESENTATIONS AND PUBLICATIONS

NUMBER OF RESEARCH PUBLICATIONS (PERCENT)

Item	None	1-3	4-6	7 or more
As Primary Author:				
Refereed journal	9.5	22.5	5.3	2.6
Non-ref. journal	90.4	8.4	0.6	0.5
As Co-Author:				
Refereed journal	72.3	21.3	4.3	2.2
Non-ref. journal	95.0	4.5	0.2	0.2

NUMBER OF NON-RESEARCH PUBLICATIONS (PERCENT)

Item	None	1-3	4-6	7 or more
As primary author:				
Refereed journal	75.6	19.0	3.2	2.2
Non-ref. journal	83.8	13.3	1.6	1.3
As Co-Author:				
Refereed journal	86.0	11.6	1.6	0.7
Non-ref. journal	93.3	5.3	0.6	0.6

Collaborative Research

Three-quarters of the respondents indicated a desire to participate in collaborative research studies. Of those interested, most would prefer working with colleagues in their own discipline at other institutions (87.5%). As illustrated in Table VIII, most of the respondents (80.6%) would prefer to participate as a co-investigator; others (67.8%) indicated a willingness to collect data; and approximately one-third were willing to assume responsibility as a primary investigator. Even though there was interest expressed in collaborative research, many indicated a need for refining their research skills.

TABLE VIII
COLLABORATIVE RESEARCH INTEREST

Item	Frequency	Percent
Interested in collaborative research		
Yes	1433	75.3 %
No	471	24.7 %
Preferred research associations		
Colleagues in your discipline at your institution	1202	84.4 %
Colleagues in your discipline at another institution	1247	87.5 %
Colleagues not in your discipline at your institution	955	67.0 %
Colleagues not in your discipline at another institution	723	50.7 %
Skills in collaborative research		
As a primary investigator	488	34.3 %
As a co-investigator	1149	80.6 %
As a data collector	966	67.8 %

Research Needs

A need for further development of research skills was indicated by many respondents (Table IX). A majority of allied health educators said they lacked adequate skills in areas of research funds, statistical analysis, publishing a paper, developing research design, writing a protocol and writing a proposal. The majority would prefer improving their research skills by attending workshops at professional meetings or national seminars (Table X).

TABLE IX
RESEARCH SKILLS NEEDED

Skill Needed	Frequency	Percent
Getting funded	1496	84.3 %
Statistical analysis of data	1288	71.7 %
Getting the paper published	1043	58.0 %
Developing a research design	987	54.9 %
Writing protocals	983	54.9 %
Writing a proposal	940	51.9 %
Writing the paper or abstract	578	31.8 %
Defining the research objective	544	29.9 %
Identifying research problems	503	27.6 %
Presenting the paper	456	26.1 %
Data collection	426	23.3 %

TABLE X
PREFERRED CONTINUING EDUCATION METHODS

Type of Event	Frequency	Percent
Workshops at professional meetings	1203	64.4 %
National seminars/conferences	925	49.5 %
Self-instructional module	809	43.3 %
Consultation service	598	32.0 %
Correspondence course	465	24.9 %

DISCUSSION

Responding to a survey questionnaire probably does not receive high priority among allied health faculty; however, a response rate of 41% is considered low for a group that should be vitally concerned about their research activities. Those who responded to this survey are presumably those most concerned with research. Yet, findings of this study indicate that, on the whole, even this group of educators lacks competence and are not very productive in the research arena.

Some explanations for the lack of research skills and low research productivity are evident in the demographic data. First, overall educational levels indicate that many allied health faculty lack formal research preparation and experience necessary for success as an independent researcher. Less than one-fifth of these educators have earned doctoral degrees while nearly a third had not yet completed a masters degree, inferring that many were only minimally prepared to conduct simple research studies. Secondly, many respondents worked at hospital-based and two-year programs where research is not high priority. Third, a significant portion (42%) of the sample taught in institutions where tenure did not apply. This group may lack the motivation offered by the synergism between research productivity and the achievement of tenure. Notwithstanding, the majority of allied health educators are in tenure track positions at four-year colleges and universities. These individuals need to actively pursue research activities in order to compete successfully with other professions in academe[1].

The time devoted to research was small, considering only 14.6% of the respondents spent more that 8 hours per week and approximately one third devoted only 1-4 hours per week to research. This finding is similar to that reported by Walker[2] who found that 36% of physical therapy educators in five countries spent 1-5 hours per week in research activities. Wendel[3] found that faculty at a major research university spent 24.6% of their time, or 12.6 hours per week in research activities, but faculty at four other four-year colleges devoted only 5.0-7.5% of time or 2.6-4.0 hours per week engaged in research activities. A study of nursing faculty revealed that this group of educators spend an average of 3.4 hours per week or 6.4% of time in scholarly pursuits[4].

Most (76%) respondents in this study said they would prefer more time for research. Furthermore, this finding was corroborated by a large majority who indicated they had a strong personal interest in research (Table XI). However, the desire to increase time for research and the expressed interest in research could be influenced by factors other than an intrinsic love for investigative work, such as the desire to obtain promotion and tenure. Holcomb and Roush[5] found that 81% of allied health institutions surveyed considered research and publications necessary for promotion and tenure. Conine and others[6] found that of the ten factors considered essential for promotion and tenure, seven were related to scholarly pursuits.

TABLE XI
CHARACTERISTICS OF THE RESEARCH ENVIRONMENT

Characteristic	High 7	Low 1	Mean
Research rewarded	. . . . x. . . .	.	4.2
Research given priority	. . . . .x . . .	.	3.9
Professional resources available	. . . . . x. . .	.	3.6
Personal interest in research	. . x.	.	5.1
Many research opportunities	. . . . x . . .	.	4.0
Computer is accessible	. . x.	.	5.1

TABLE XI (CONT.)
CHARACTERISTICS OF THE RESEARCH ENVIRONMENT

Characteristic	High 7 — Low 1	Mean
Research is financially/ administratively supported	. . . . .x . . .	3.5
Department supports research	. . .x	4.4
Coworkers encourage research	. . . x.	4.2
Statistical services available	. . .x	4.5
Research important for promotion/tenure	. . .x	4.5
Importance of research vs. service vs. teaching is well defined	. . . . . x. . .	3.5

Approximately half the faculty in this study were involved in one or more projects as a principal investigator (53.8%) or as a co-investigator (55.5%). Since 69% of the respondents said they spent four hours or less per week in research, the results seem inconsistent. Blackburn[7] noted that a small number of faculty members are very prolific in research and they publish 90% of journal articles. However, the other faculty members cannot afford to be unproductive or unscholarly; results of this study indicate that many are involved in organized research but may not have sufficient time to complete the work and publish the results.

It is also important to note that approximately half the respondents in this study participated as a principal investigator while only one-third presented or published papers. This is further evidence that research is being conducted but perhaps not disseminated through professional meetings and publications. Similarly, Walker[8] found that over half of the respondents in her survey participated in research but only about one-third were involved in dissemination of results. Nevertheless, Onuoha[9] reported that occupational and physical therapists in Canada had many presentations and publications to their credit.

The respondents participated in a diversity of research projects with the majority involved in more than one area of investigation. In addition, a large majority were both interested in collaborative projects and were actively involved in some type of collaborative research association. Collaboration has been shown to provide maximum usage of resources, access to increased numbers of subjects with wider generalization of results, and mechanisms for replication[10]. The most common current collaborative association was within a discipline at the same institution with only half as many collaborating with other allied health professionals or within their disciplines at other institutions. A large majority preferred collaboration within their own discipline which may indicate a perceived lack of common areas of interest or issues of overlapping roles and practice with other allied health professions. Interdisciplinary and intra-institutional research projects face the problem of project initiation as well as logistical problems of location. The faculty were most willing to serve in the role of co-investigator for collaborative projects, indicating a lack of confidence in research abilities, skills, or time to be a principal investigator. Other faculty may prefer to use joint studies as an opportunity to observe and learn research skills. Fewer faculty indicated a desire to serve in a data collection role indicating a desire for higher level involvement with possible greater rewards and recognition.

Findings in this study revealed some discrepancies in the data. For example, few participants identified needing assistance with presenting a paper (Table IX) but the vast majority have never made a presentation (Table VII). This may suggest low priority for reporting results, lack of adequate funds, or limited accessibility to research projects. While most of the participants completed statistics coursework as part of their education, over 70% reported needing additional skills in statistical analysis (Table IX). This implies that most allied health faculty do not feel confident when working with statistics even though they have had formal preparation in the subject.

Most allied health faculty preferred to attend workshops at professional meetings or national seminars to develop skills required to perform research. Although most respondents indicated a preference for national workshops, Brunner[11] reported that allied health department heads are willing to support travel an average of 95 miles and pay an average of $64 per day for continuing education. Administrators should be forewarned that travel funds must be appropriated if the perceived research continuing education needs of faculty are to be met.

Results of this survey indicate that the environment in allied health may not be totally supportive of research efforts. On the one hand, there is high personal interest in research, a desire to devote more time to this activity, and participate in collaborative studies. However, respondents indicated a lack of financial/adminstrative support for research. The discrepancy between interest and support may in part explain the overall low research productivity in the allied health professions. This disparity may also contribute to the confusion that seems to exist about the relative importance of research, teaching, and service.

SUMMARY AND CONCLUSIONS

Although allied health deans have affirmed that research is a critically important area for faculty performance[1], faculty members report only a few hours per week spent in research. This reflects a discrepancy between the ideal and the actual in faculty research productivity. Comments sections of the survey suggested that faculty members' time for research is severely limited; few resources and support services for research projects are available; and many reported a belief that they had an insufficient background in research skills. The number of faculty holding earned doctorates (19% of respondents in this study) may account for the perceived lack of background in conducting research.

If the adminstrative goal for increased research performed by allied health faculty members is to be met, changes in appointment requirements (increased emphasis on research degrees such as earned doctorates) may be warranted. In addition, allied health administrators should consider the balance between teaching and research expectations, and the equipment, laboratory, and support resources necessary for research.

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COLLABORATIVE RESEARCH BETWEEN THE ALLIED HEALTH PROFESSIONAL AND INDUSTRY

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ABSTRACT

Today, many allied health educators find themselves in academic institutions which require a research record for continuing appointment. Unlike their colleagues in biology and chemistry, most allied health educators who enter academic life are practitioners who may only have experience in their professional practice. In addition, most lack research experience and/or established research records. Without grantsmanship experience and appropriate publications, it becomes almost impossible to compete for the already highly competitive grants.

The intent of this paper is to highlight an alternative to the traditional funding sources. This alternative involves the collaboration of allied health professionals and industry. A five year collaborative research project between the two has led to a number of publications and presentations. The focus of the research has been to develop new methodologies and applications of a manufacturer's product (instrument, reagents, etc.) in the clinical assessment of disease.

The major advantages of this type of collaborative research is that both parties will benefit. The allied health professional will have the opportunity to use the state of the art equipment, collaborate with industry's research and development departments, and establish a research record. By participating, industries increase their research and development staff without added personnel costs, expose their instrument to the scientific community, and obviously, increase their potential for sales or new market.

Our collaborative research with industry is now reaching its sixth year and has exceeded all expectations for both parties.

INTRODUCTION

Today, many allied health educators find themselves required to meet the same standards as their colleagues in biology and chemistry(1). Unlike their colleagues, most allied health educators who enter academic life are practitioners who may only have experience in their professional practice. In addition, most lack research experience and/or established research records(2). Because of these deficiencies, many are required to learn a new skill before they begin to attempt research. Even if one enters academic life with research skills, he/she will soon find that without grantsmanship experience and appropriate publications, it becomes almost impossible to compete for the already highly competitive grants.

In spite of these deficits, many allied health faculty are presented with the same criteria and/or time period as the rest of their institution's faculty, in that they must produce a record of scholarly publications in order to receive promotion and/or tenure.

While the present economic conditions make it even more difficult to obtain the traditional funding (i.e., National Institute of Health), there is an alternative. This alternative involves the collaboration of allied health faculty and industry. Unlike most science faculty, allied health faculty are applied scientists and their research can influence the products used in the delivery of health care.

For example, if a laboratory scientist (medical techologist) develops a new method that has higher sensitivity, specificity, and is less costly than the present method for the screening of hyperlipoproteinemia, it will change the way in which the nation's laboratories perform the test. This method, in turn, may require a new product line of reagents and/or a new instument which, in turn, may develop a new market for industry.

The intent of this paper is to present a summary of a six year collaboration between medical technology and industry.

COLLABORATIVE RESEARCH

Collaborative research between the Department of Medical Technology, School of Allied Health Professions, S.U.N.Y. at Stony Brook and industry began in 1980, when a medical technology faculty member published a paper demonstrating a possible new technique for assessing fetal lung maturity. This technique required the utilization of an infrared spectrophotometer, an instrument generally not found in a clinical laboratory.

Shortly after the publication appeared in print, a representative from a manufacturer of infrared spectrophotometers contacted the department. The two parties agreed to meet and discuss the research. At the initial meeting, the allied health faculty member presented the clinical problems in assessing fetal lung maturity and why the new method offered more accurate predictions. Industry, in turn, informed the faculty member that the instrument used in the research was outdated. They provided knowledge of the newer technology and why these advanced analyzers would improve the method even more.

After a number of meetings, it was agreed that the company would provide the department with state of the art equipment and technical assistance from their research and development department. In turn, the medical technology faculty member agreed to share authorship of future publications and allow editorial rights to the manufacturer.

At present, this collaboration is in its sixth year and has led to six publications[3,4,5,6,7,8], (two more are presently in progress), four published abstracts and presentations, $60,000 of donated equipment, and experience that has enabled us to attract another manufacturer to sponsor research in our school.

BENEFITS OF COLLABORATIVE RESEARCH FOR ALLIED HEALTH AND INDUSTRY

There are major advantages for both allied health and industry in collaborative research. This kind of collaboration allows the allied health professional the opportunity to use state of the art equipment, collaborate with industry's research and development departments, and establish a research and scholarly record for promotion and/or continuing appointment.

For industry, it offers the opportunity to affiliate with an academic instituion and/or health sciences center. The collaboration adds staff members to their research and development department without increasing their personnel expenditures. It allows their staff to participate in clinical research and to perform analysis on normal and abnormal biological (clinical) samples. The affiliation offers a possible site where they may assess new methods and instruments designated for health care delivery, but more importantly, by working with the allied health faculty member, they have the opportunity for developing a possible new market, as with the relationship described in this paper.

CONCLUSION

This paper demonstrates that collaboration research between allied health professionals and industry can prove to be a most eventful relationship. The economic conditions of today can only reinforce the need for such collaboration, because very few scientists and companies can afford to work in isolation. As in health care delivery, the team approach will always exceed any individual effort.

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PART II

RESEARCH RELATED TO EDUCATION OF ALLIED HEALTH PROFESSIONALS

In the second part of the Symposium, four research papers were presented addressing different dimensions of allied health education:

The Interdisciplinary Approach to Health Promotion on Campus: Documentation of an Experiment in a Multiethnic Environment

The Impact of an Interdisciplinary Master's Degree Program on Allied Health Professionals' Leadership Abilities

Recruitment of Minority Allied Health Professionals: An Enrichment Workshop Based on Profiles of Successful Practitioners

An Interdisciplinary Approach to Non-verbal Communication

THE INTERDISCIPLINARY APPROACH TO HEALTH PROMOTION ON CAMPUS:

DOCUMENTATION OF AN EXPERIMENT IN A MULTIETHNIC ENVIRONMENT

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ABSTRACT

This paper will present the experience of a health promotion campaign by interdisciplinary team students at Lehman College. The decision to involve students in such a campaign was based on the belief that early supervised field work, dealing with bona fide health problems within a real, but manageable setting, will be an educational experience both stimulating and beneficial.

Baseline data on the students' health status was collected in a collegewide random sample health survey. Members of the health teams, which included students from social work, nursing, health admnistration and medical students, were required to design and implement a project for an identified health need in the multiethnic campus community. The topic and format of the project was up to the discretion of the team members, but the students were encouraged to utilize the interdisciplinary perspective in the design and implementation of their projects.

Each team, advised by a faculty member from a different discipline, was evaluated by its process and its outcome. Specifically, it includes the following areas: 1. theoretical formulation of project; 2. project development and implementation; 3. project presentation and recommendation.

The semester's activities were documented in videotapes. Experience and findings were shared and discussed with Conference participants. Implication for future curriculum design was explored.

INTRODUCTION

This paper presents the experience of a course on interdisciplinary health care team at Lehman College. Last year, the faculty team decided to modify its traditional curriculum by involving students in a health promotion campaign on campus. This decision was based on the beliefs that 1) health professional students can play a vital role in raising the health consciousness and promoting health behaviors among students at Lehman College, 2) early supervised field work, dealing with bona fide health problems within a real, but manageable setting, will be an educational experience both stimulating and beneficial.

I. Description of the Traditional Health Promotion Course

The two semester course was oriented towards an experiential approach to learning[1]. It was used to enhance the personal development of students to enable them to function more effectively as members of health care teams. The course focus on concepts, skills and techniques of team building and team development. Some of the topics included: interpersonal communication, goal setting, problem-solving, decision-making, leadership behavior, conflict-management, role definition and negociation, etc. The course was taught by an interdisciplinary faculty team representing each of the four disciplines in the program, Health Services Administration, Medicine, Nursing, and Social Work.

II. History and Development of Course

Involving students in direct health promotional programs on campus was an evolutionary process on the part of both faculty and students. In the past, students in the HPI 300-302 courses had visited various health agencies to observe health professional teams in action. Besides the obvious scheduling and logistic problems of this experience, students were indeed only observers. Their direct team work with one another revolved around the writing of a paper reporting these observational experiences. Both students and faculty expressed dissatisfaction with this project as a student learning experience. Students thought they were not actually dealing with the reality of working in a health care situation as a team; faculty thought that there was far too much emphasis on the writing of a voluminous paper which was based on imcomplete observational data. The student project therefore was modified to that of having student teams identify a health promotion/education need on campus and plan a program to meet that need. The teams then presented their health programs to the rest of the class. The change of emphasis in the project from observing to doing was evaluated by faculty and students as an improvement over the previous year's effort.

III. Evolution of the Health Promotion Campaign

On the part of the faculty, there were lingering questions that the student projects might still be selected haphazardly without consideration of the relevant health need on campus. In an attempt to arrive at a more objective decision, faculty members have carried out a separate collegewide health survey with the help of students. Baseline data on a random sample of close to one hundred students' health status were then collected, analyzed and presented to the students at the beginning of the HPI course. Thus, the HPI students were able to identify and work on the health needs, based on actual information expressed by their peers.

Many of the students in the course had numerous years of employment in the health care field prior to entering college. As adult learners, they could integrate their past experiences with the didactic theories in this practical learning situation. Because the students were on campus for the project, their project development was able to receive direct supervision and resources from faculty members. This past year, the reality of the situation has stimulated a lot of interest among the participating students. It has lent meaning and a sense of urgency to the projects they must carry out. An actual health promotion campaign offered an opportunity for the students and faculty to apply immediately the techniques and skills discussed during lectures.

IV. Students' Response to the Structural Change

The students were divided into four teams of 8 to 10 students. An attempt was made to have, on each team, a fairly equal representation of each of the four health disciplines. Members of the health teams were required to design and implement a project for an identified health need in the multiethnic campus community. The topic and format of the project was up to the discretion of the team members, but the students were encouraged to utilize the interdisciplinary perspective, focussing on the actual needs of students on campus. This comprehensive approach was expected to unify the different disciplines, and provide content to interdisciplinary team work.

Besides the challenge of a real health promotion campaign, the students were also given, at the beginning of the course, a set of criteria for evaluating their performances. They were expected to follow a detailed course schedule, from the theoretical formulation to implementation and final presentation of project results to the College. Students' acceptance of these operational guidelines thus provided a framework where different team efforts could be measured. This modified curriculum structure was found to channel much of the students' energy towards the team itself. In the past, prior to project implementation and presentation, pressure due to delay in start up and subsequent anxiety among students had often generated aggressive outbursts directed towards the faculty. With the curriculum change last year, anxiety among students had instead raised the level of tension within the teams. Team members had to resort to many of the skills discussed in class to manage their internal conflicts. Faculty members were left in a position to be facilitators and advisors in the student efforts to complete their projects. This change in student attitude and behavior has led to a more productive learning experience.

V. Team Evaluation: Process v.s. Outcome

Based on the survey results, four projects were implemented in the health promotion campaign. They were: 1) Effects of alcohol on studying and learning; 2) Health education on AIDS; 3) Pamphlets on junk foods v.s. nutritional foods; 4) Videotape on use of campus health resources.

The evaluation of each team's performance was one of the faculty's course objectives. The focus was on the identification and observation of relevant factors in the process and outcome of the team experience. To find out which student team did better, the faculty selected and presented to students a set of criteria for evaluation: creativity, degree of goal attainment, group process, utilization of team members, and clarity of presentation. The faculty was interested in how each team accomplished their goals. In their evaluation, questions such as the following were asked: How did they come up with the project? Did they spend an adequate amount of time to generate ideas? Were everyone's ideas solicited? What was the process of weeding out some ideas and selecting others? What kind of impact did it have on the future function of individual members and the team? What kind of conflict did the team encounter? How did it arise? How was it resolved?

Another question was raised concerning individual's contribution towards team achievement. Sometimes, a project is almost entirely dependent on one or two members, who, through their energy and drive, carried the project through completion. In this case, if the outcome of the project is successful, is this a good team even though the process has a lot to be desired? Our experience indicated that the level of participation of all members and their interaction will reach a maximum limit due to the time and abilities of all those involved and the resources that they can obtain. A better process will lead closer to the limit. A very poor process can bring down even the most brilliant leader in the team. One way of looking at the situation is that members in the team must be interacting with each other. Different members possess different abilities, knowledge, and perspective. A good team is one where all of its members' strengths are tapped effectively.

VI. Example of a Project Development

Based on survey data, members of one team identified alcoholism as a campus health need. At first, however, they expressed concern about their own limited knowledge to adequately address such a health care need. They were also cynical about what new and different things they could offer about alcoholism which "everyone knows about". At this point, the facilitator, who is a nurse, encouraged the team to search within themselves and to think about what goals and motivations college students had, and what health care practices could help them and other students to reach their goals. Soon, team members noted that most students were under pressure to obtain "good grades" and "get a college degree". They also began to talk about why some students became involved in substance abuse and how this affected their behavior in school. The team decided that if they could inform students about how alcohol affects learning and studying, from a peer's perspective, they might be able to offer a new "twist" to what they considered to be a familiar subject.

In planning and developing the program, team members began to utilize their specific professional skills. The HSA students carefully analyzed the baseline data for statistics to support this project as meeting a definite health need; they organized the logistics of the actual program implementation (location, equipment, coordination with campus departments) and worked with a budget. The medical students researched the actual content of the effects of alcohol on brain function and worked with the social work students in translating this into a format students could quickly and easily understand. The social work students also researched community resources for referrals if necessary.

VII. Obstacles in Team Development

As in the development of most teams, Lehman students had their share of difficulties. The challenge presented to one team involved issues of leadership, conflict resolution, power and authority. To gain a clearer perspective of these issues, it is necessary to understand the nature of health professions, which involves a knowledge of human beings, the sources of their problems, and the forces that keep the problems in place.

In this aforementioned team, members had established four goals for their health promotion project on campus:

1) To provide information about the nutritional content of the food which is conveniently available to Lehman College students.
2) To make it clear that it was possible for Lehman students to eat a nutritional meal even with limited time and funds.
3) To educate Lehman students as to exactly what objectives idealize good nutrition.
4) Increase awareness of nutrition on campus.

To arrive at these goals, members of the team had to struggle with process and content issues typical of most interdisciplinary teams. Interaction of team members often reflected core problems in team functioning. The topic of nutrition was suggested by the facilitator, who is a social worker with a research interest in nutrition. At first, however, there was no "burning curiosity" in the topic among the group members. It was only after two sessions of brainstorming that they finally decided to settle upon nutrition as the topic for their project. They felt that nutrition, as an interdisciplinary project, would coincide with social work's commitment to the biopsycho-social model of practice which focuses upon the whole person interacting in his/her environment.

Social workers, and social work students in particular, sometimes feel helpless when confronted by the power of authority of another profession, especially that of the medical profession. This is so because of social work's history of subordination to physicians in the traditional "medical model". This was perhaps why, at the beginning, the presence of three medical students on this team constituted an obstacle to task accomplishment.

At an early stage, members readily "accepted" a medical student as a strong leader. But the necessary "bid for power" stage was suppressed, thereby creating a great deal of tension which surfaced later in the form of overt conflict. The conflict involved one social work team member who felt ignored by the group. She withdrew from the team both emotionally and physically. Facilitator's attempts at mediation were futile. The student's behavior was significant because in a symbolic sense she was acting out what many other group members felt. They had never dealt with the "why we are here stage" as demonstrated by the unchallenged assumption of leadership by the medical student. Shortly after this disgruntled social work student withdrew, other social work students voiced that they failed to see a social work aspect in the issue of nutrition. At this point, the facilitator had to employ her skills at conflict resolution and mediation. By helping them to acknowledge their role in ceding power to the medical student, a shift in the leadership and role structure took place. Consequently, the social work students were willing and able to identify the social and emotional facets of nutrition. Ironically, each discipline then began to offer their expertise to the group. The social work students assumed a major responsibility for the group's expressive function. One, in particular, emerged as an initiator, mediator, and group encourager. This helped the group to attain a degree of cohesion and members felt more integrated. One health service administration student coordinated the project, while the medical student maintained her leadership role as the group facilitator and task leader. Interactions of the team members no longer pulled the team apart, but served to create a structure for problem solving. The project was a success.

VIII. The Medical Perspective

Unlike other students in the team who have had one semester's experience in group process and development, the medical students were exposed to team concepts in a brief (three sessions) seminar series just prior to entry into the HPI team course. These first year students had been assigned to one of four teams by a lottery technique. The teams, designed to include eight to ten students each, were each assigned three to four medical students (eleven medical students participated in the course). In all, there were nine women and two men, four Afro-Americans (women) and seven Euro-American medical students.

Two major obstacles to team development were exhibited by the medical students. The first was a strong value of independence/control. The medical students resisted questionnaires designed to describe their initial images of the other professional groups. This was a source of group conflict between the physician faculty member and the medical students. It contributed to the length of the "polite" stage in the development process of the four teams[3].

The second obstacle was the self-perceived special status of the medical students. During the intensive implementation phase of the health promotion project, medical students had an examination at the medical school. After the exam, half of the students were absent from the team class. The other half wanted to be excused. This class day was one when the teams were scheduled to implement their projects on the Lehman College campus. This crucial task was compromised in one team, and negatively affected in the other three. This paricular day's events were the subject of intense faculty-student and student-student interaction. They were critical to the "constructive" stage for all the teams and the "esprit" stage for some of them.

In a discussion of obstacles to team development with regard to medical students' participation, perhaps the following areas can shed some light.

First, the image of medical students in the eyes of the administration, nursing, and social work students was one of highly knowledgeable, clinically advanced, student professionals destined for leadership positions. These perceptions, however, were tinged with expectations of arrogance, aloofness and lack of cooperativeness, experiences shared by the other professional students from their past contacts with physicians.

Second, as the students came together in their teams, the medical students were quickly accepted as team members in the manner of an exaggerated "polite stage" of group development. In a five stage model of group development from "polite" to "esprit" stages, other students tended to remain in the polite stage with regard to the medical students[2]. At the same time, medical students' behavior towards administration, nursing and social work students tended to be in the "why we're here" or "bid for power" stages. After several of the two-hour weekly sessions, the image of medical students within the team has changed to one of students with similar knowledge bases, and little or no clinical experience. With the exception of one medical student who has been a trained social worker, clinical experience of medical students is predominantly less than that of the other professional students.

Third, the medical students felt they were put on the spot. They perceived themselves as novices in team skills, new to the group, with little knowledge of who the other students were. These perceptions did not, however, make them cautious in their early participation in the team process. Rather, they elicited a defiant response that was quite verbal and direct. It took three to four weeks for the new and old student team members to reconcile their views of one another.

Fourth, this readjustment was reached by resolution of the "bid for power" issues and the adoption of a common identity for all the professional students: Members of a Health Promotion Team.

Last, medical students reported that they experienced a meaningful role, health promotion, which they shared completely with the other team members. This was the first, and possibly the only formal professional team development which these students will experience during their required medical training.

IX. The Media Approach

Problems in team development affected all four teams alike. The team facilitated by the health administration faculty was no exception. In fact, intense hostility among some members filled their daily logs with complaints and accusations of each other's irresponsible behaviors and botched jobs. The personal antagonism among some older team members was further aggravated by the arrival of medical students. In spite of these obstacles, this team was later judged to have completed the best project. The project involved the promotion of available services at the Nursing Health Information Center on campus. The topic was chosen because survey results indicated a low visibility of the Center. Even though the Center was staffed by a number of nursing faculty members and students, carrying out programs emphasizing health promotion and disease prevention, a large proportion of minority students have neither heard of, nor used the Center. In response, the team produced a beautifully designed newsletter, and an effective videotape to inform other students of the health services that are available on campus and in the community. Success of this team was attributable to three factors. 1) Task orientation, 2) Distributive leadership, and 3) Media coverage.

Because of the lack of resource and space, this was the only team whose process was videotaped at every session. Feedback provided by videotapes not only stimulated interest among members, revealed their internal conflicts, but also helped to submerge inappropriate behaviors. The knowledge that their actions were recorded and that they could be minutely studied might have lent an unreal element in the members' interaction. On the other hand, it might have also conferred a sense of importance to the gathering of members, raised their self-esteem and self-image, encouraged their willingness to manage conflict, and facilitated their strive for excellence.

The focus on task accomplishment was an important factor in this team's ability to overcome personal differences on their way to success. Futile attempts had been made by the facilitator, who tried to bring up the issue of interpersonal conflict and to seek an early resolution within the team. The interpersonal conflict was never dealt with directly, nor was it amiably resolved. The involved parties were able, however, to suppress their personal differences at all the crucial moments to accomplish the tasks on hand. Depending on the demands of different situations, different members would rise to meet the needs of the team. Thus, an observation: A team with a task orientation tends to develop distributive leadership. It may not be productive to stress only on the achievement of harmony within a team.

VII. Conclusion

From a faculty viewpoint of teaching/learning, this year's project format is successful. The student teams had to identify a community (campus) health need, plan a program for it, implement and evaluate the program. It was necessary for them to utilize knowledge of both health care content and team work to accomplish this. They were accountable not only for a classroom assignment but accountable to peers and colleagues for accurate and relevant information.

Evaluation of last year's efforts probably can be improved. Better analysis may result if there had been a more quantitative measurement of all the relevant factors. For example, the possibility that a member's ability may bring so much influence to the task achievement of a team, may call for a more careful control of different members' ability levels. Members' participation in the team may be better measured by a matrix table of team maintenance function, task function, and individual behaviors. A sociogram may be used to describe the pattern of interaction among the members, indicating the direction, reciprocity of communication, etc. A group development scale may also be utilized to measure the progress of the different phases towards the achievement of goals.

Perhaps, the most important aspect of last year's experience is that of students learning about provision of health care to a relatively well population in a given community. Health care will be focused on what the clients/consumers want --health promotion--and located where they are--in the community. It is this orientation to health care that our students can learn from this project.

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THE IMPACT OF AN INTERDISCIPLINARY MASTER'S PROGRAM ON ALLIED HEALTH PROFESSIONALS' LEADERSHIP ABILITIES

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ABSTRACT

The Master of Health Professions Education (MHPE) Leadership Degree is an interdisciplinary program for individuals in or aspiring to leadership positions. It has enrolled 40 students since 1983, 25% of whom have been allied health professionals. This study examined the impact of the degree upon allied health graduates' careers and to what extent it increased their leadership activities according to predetermined criteria. Due to the small number of graduates (11), four of whom are allied health professionals, the case study method was selected. Quantitive and qualitative data were collected from program records and from intensive interviews with the graduates.

The results indicate that all allied health graduates are now administrators with responsibilities for running educational programs, with three assuming their positions after completing the MHPE. Other data revealed that each has exhibited growth in leadership according to the criteria set forth, ranging from redesigning curricula to increased participation in professional associations and scholarly activities. An unexpected impact of the program revealed a notable increase in the number and types of interactions between the allied health graduates and other health professionals. In the course of an ongoing program evaluation, data are being collected to determine if the findings from this study hold true for other professionals in the program. One hypothesis being tested is that allied health professionals benefit to a greater degree from an interdisciplinary program than do other professional groups.

INTRODUCTION

In 1980, The National Commission on Allied Health Education included the following recommendation in its final report: "The development of leadership in the clinical, managerial, and educational areas should be a priority for allied health education."[1] Calls for leadership are not limited to the disciplines of allied health nor to the health professions; indeed, the need for leadership in every field has become evident recently and training for leadership has become a crusade of sorts.[2-4] The purpose of this paper is to describe and evaluate one effort at promoting leadership in health professions education through an interdisciplinary master's degree program in education and management at the University of Illinois at Chicago. Additionally, the program's impact on the leadership abilities of allied health graduates will be discussed as well as the question of whether allied health professionals benefit from leadership training more than do their peers in the program.

LEADERSHIP AND LEADERSHIP DEVELOPMENT PROGRAMS

The concept of leadership is a nebulous one and has variously been described as a combination of inherent traits,[5] behaviors,[6] and a combination of circumstances.[7] In addition, the study of effective leadership is further hampered by the lack of consensus as to what leadership actually means. Stogdill[8] defined leadership as a characteristic of group functioning that results from the interactions of the leader, the group, and the situation in which the interaction takes place. Leadership is thus characterized as a process of influencing the activities of an organized group and its efforts toward goal setting and achievement. While other theorists have attacked this definition as being insufficient or too broad,[9-11] it remains the most widely used in the literature.

Perhaps a more useful and practical definition of leadership does need to be developed, one that addresses the conflicting theories and at the same time acknowledges that the nature of society, its professions, and the characteristics of effective leadership are rapidly changing. Bridger and White[12] have emphasized that modern leadership must confront situations and complexities previously nonexistent, and note that the modern leader must be able to cope with rapid change both within and outside the organization in order to be effective. Educating individuals for positions of leadership thus would equip them with the tools necessary to manage change in a constantly variable and mutable environment, rather than focus on training in one particular style or method of leadership. This approach seems especially appropriate for the health professions given the constantly changing nature of the environments in which they function.

Numerous leadership development programs have been described in the literature, and increasingly ones are being developed for the health professions. While most of the latter are courses included within regular curricula,[13-14] a few are fully-developed programs offering degrees to individuals in allied health.

The Graduate Program at the School of Allied Health, University of Connecticut, prepares professionals in dietetics, medical technology, and physical therapy for positions as administrators, educators, or applied researchers.[15] This interdisciplinary program offers opportunities for increased understanding of the roles and functions of health colleagues, provides a forum for interactions among disciplines, and reaffirms that social or health problems can rarely be solved by a single health discipline. The Allied Health Teacher Education and Administration Program, jointly offered by the Baylor College of Medicine, The University of Houston, and Texas A & M University is another well-documented and successful program.[16] It has demonstrated a high rate of preparing its graduates for positions such as department chairs, education coordinators, or faculty members. The Master of Health Professions Education (MHPE) Leadership program, administered by the Center for Educational Development at the University of Illinois at Chicago, is an interdisciplinary program and is described in detail in this paper.

MHPE Program. The Master of Health Professions Education program was started in 1960. It was revised in January, 1983 to provide a focus on leadership. Candidates for the program are health professionals presently in or preparing for educational leadership positions who lack formal training in education and management. Students are drawn from each of the health professions locally, nationally, and internationally.

The MHPE program is organized around established principles and practices of adult learning. Participants' individual needs and professional problems provide the focus of the curriculum which offers organized instruction in a format that takes into account the schedules of busy professionals. The MHPE program also allows for maximum diversity in terms of individual program planning and self-study, and sustains an academic environment based upon collegial relationships rather than the traditional teacher-student model.

The program (1) addresses how effective leadership influences an institution, (2) is based upon a problem-solving model that uses the professional's work environment as a laboratory for the application of educational and mangerial concepts, and (3) provides content through intensive workshops and supervised independent studies rather than through traditional survey courses.

The core curriculum consists of four educational experiences called "blocks." Each block consists of a concentrated two-week period of instruction followed by eight weeks of independent study on a student-selected problem which exists in his or her home instituion. These blocks do not have to be taken sequentially and do not require students to be in residence in Chicago for periods longer than two weeks. The primary content addressed in the core curriculum is shown in Figure 1. The blocks comprise one-half of the 48 credit hours necessary to complete the degree. Additional credit hours are accumulated through elective coursework, independent study, and thesis research.

Since its reorganization to its present format in 1983, the MHPE program has enrolled 47 students, 10 of whom have been from the allied health professions, 14 from medicine, 6 from dentistry, 8 from nursing, 1 pshchologist, and 8 adminstrators of health agencies such as accrediting bodies. Ten countries are represented, including developing countries in Africa and Asia.

METHODOLOGY

The following design is being employed in order to assess the effectiveness of the MHPE degree program in preparing graduates for leadership positions. One year after students graduate, their records are pulled and examined to assess prior positions and leadership activities. Graduates are then contacted and interviewed using a standardized interview guide. These interviews, usually taking 45 minutes to one hour to complete, are tape recorded and analyzed. Overseas graduates are sent a copy of the questionnaire to complete. The results are then reported according to the case study method.

Each case is analyzed according to predetermined criteria of leadership. Some of these criteria are directly related to the program's stated goals, while others are predictions of activities that might logically be expected to result from participation in such a program. As of the summer of 1985, 11 students had graduated and 10 have been interviewed. The non-respondent is a foreign graduate who has not yet returned the questionnaire. Three of the four allied health graduates are medical techologists; the other is a radiation therapist.

THE RESULTS

Results of the interviews with the four allied health graduates are organized and reported here around the following themes: administrative, educational, and professional leadership.

Administrative Leadership. In the interview, MHPE graduates were asked about activities which would provide evidence of administrative leadership within their organizations. The first issue examined was whether graduates had experienced upward job mobility.

Of the four allied health graduates, three were in positions with professional titles of higher standing, indicating promotions in their organizations. The fourth entered the program with the intention of remaining in her position as program director for a medical technology education program. Using this simple measure, allied health graduates experienced upward job mobility, as did most of their peers in the MHPE program.

When the nature of allied health graduates' new positions were compared with those previously held, it was found that each was a full-time faculty member and also responsible for educational program administration. Two had previously been

Figure 1. Core Curriculum Content of MHPE Program.

BLOCK	CONTENT ADDRESSED
Block I: Historical, Social & Organizational Contexts of Health Professions Education	--Philosophical & historical issues in health professions education --Professionalism and professional socialization --Managerial & organizational issues
Block II: Health Professions Education Planning	--Program planning --Curriculum design --Instructional methods --Relationship between health professions education & health services delivery
Block III: Program Evaluation	--Evaluation design --Data collection methods --Data analysis --Political uses of evaluation --Ethical issues in evaluation --Cost-effectiveness of evaluation
Block IV: Leadership Profiles & Practices	--Leadership styles and practices --Organizational development --Group process --Managerial aspects of leadership

employed as bench medical technologists. The third, formerly the director of a hospital radiation therapy program, became the assistant director of continuing education at a local college.

Another issue concerned the introduction of change at the organizational level. For instance, had the graduate conceived of and introduced any schemes or innovation which would affect their institutions at the organizational level? Additionally, these questions probed the process respondents used in introducing these changes.

All graduates interviewed had introduced, to some degree, changes within their institutions. For most graduates, these changes were concerned with redesigning curricula, which was categorized as a form of educational leadership. However, the graduates from allied health disciplines were involved in projects and activities which had more significant effects upon their institutions. A recurring theme raised by allied health graduates centered on economic factors within the health care industry and the specific, often dramatic impact of the DRGs on their organizations. This issue was not often raised in the interviews with graduates from other professions.

One graduate, the director of a medical technology program, noted that "the hospital was in the process of cost-containment and decided that it was going to discontinue the program. Through my efforts of putting together a cost-analysis of the program and showing them how valued and valuable this program has been, I proved it actually doesn't cost the money it seems to cost in terms of the service it provides." She also received the support of other professional groups, most notably the pathology department, who joined her in pressing her case. The hospital decided against abolishing the program.

Another graduate, a faculty member in medical techology at a university, discussed her efforts at replacing a clinical affiliate. "It's been rather difficult because the whole health care industry is undergoing a lot of change, especially with things like the DRGs. Hospitals are tightening their belts and getting rid of programs that are not revenue-producing. I knew that for a hospital to join us it would have to have a commitment to education." In order to attract a suitable site, she mounted seminars on the directions health professions education is taking in the Chicago area, and invited representatives from potential affiliates. Although it took a year longer than anticipated, her recruitment efforts resulted in not one, but two new clinical affiliates for her university.

Since the program enrolls students from each of the health professions, the data collection process paid special attention to the effects of an interprofessional program on graduates' attitudes toward and interactions with other professional groups. Unexpectedly, it was this aspect of the program that was cited by all respondents as one of its most positive characteristics.

One allied health graduate, in explaining why she chose the MHPE program, said that she had wanted an environment in which she would meet and learn from people in other health fields. "We forget that there are other health professionals out there with expertise in their areas," she noted, "And we don't often collaborate and work together as a unit." Another medical technologist echoed her peers in the program when she commented that "one of the things that stood out the most was that we have many concerns in common, similar basic goals, and that many of the solutions to our problems are often transferrable from one profession to another." She concluded by saying that "a variety of perspectives yields a greater product. I got a lot from sharing the common problems."

One of the physicians responded that "we're all very much in the same boat in terms of what the issues are...and that was eye-opening and destroyed some of the chauvinism that goes along with each of our professions. It helped build a more collaborative way of thinking about other health professionals."

These new and positive attitudes about other professional groups, especially if held by people in positions of leadership, could be expected over time to result in increased interactions among the professions. Nonetheless, it was surprising to discover how quickly the allied health graduates had initiated interprofessional and interdisciplinary activities. For instance, one of the medical technologists successfully lobbied to become a presenter at case study seminars for the hospital's other departments in addition to physicians. Her efforts also resulted in increased visibility and respect for her department.

Further evidence of increased interdisciplinary activity can be seen in the case of the radiation therapist who took a position in continuing education and now runs a program for allied health professionals and nurses, and in the case of the program director who solicited, and got, the support of the hospital's pathologists in her battle to keep the hospital from abolishing its medical technology program. Additionally, she is working on the development of an interdisciplinary curriculum which will involve three departments.

Education Leadership. Because the MHPE program is concerned with both educational and administrative leadership, this area was also examined. Students entering the program vary widely in terms of their teaching and administrative experience. Some are part-time faculty; others are administrators of hospital and university-based programs, with many of the foreign students holding high-level positions in the health ministries of their countries. In all of these diverse settings, graduates reported the most significant influence of the MHPE program on their activities as being in the ares of curriculum and instruction.

All of the allied health graduates reported the revision of existing or the introduction of new curricula, One of the medical techologists discussed the difficulties encountered in exerting leadership in this area. After describing the revision made in the clinical curriculum in her department, she added: "Instead of looking at our philosophy or making a comparison with other schools, I feel we just came up with three different plans and chose one. It seems strange that we would have gone about...making such a change so haphazardly. It was something I knew was wrong. I feel badly because I was exposed to a different way of handling change, but between my teaching and professional commitments I just had too much going on and didn't have time to deal with it."

This same graduate described her goal upon entry to the MHPE program as that of becoming a full-time teacher. In her present position she had concentrated her efforts on the improvement of the delivery of instruction and upon action-research, especially in regard to experimentation with such innovations as problem-based learning. Allied health graduates reported other changes such as the implementation of a department-wide, instructional evaluation study that included a faculty development component.

Of special interest are allied health faculty's relationships with their students. All reported increased sensitivity to the needs of students and a different posture toward the teacher-student relationship, which they report as becoming more collegial and open. Another graduate discussed her increased concern with professionalization and her acute awareness of her students' needs for good role models, a function she perceives as an important one in her teaching.

Professional Leadership. Of the 10 graduates surveyed, 4 have since published articles or presented papers at national meetings of professional associations. Of these, one was a physician and the others were from allied health.

An examination of admissions records revealed that only one of the allied health graduates had previously been engaged in such scholarly activities. Since leaving the program, these three graduates have published a total of four articles, with one other submitted, and presented five papers. This means that 40% of the MHPE graduates surveyed so far, and 75% of the allied health graduates, have demonstrated academic leadership beyond teaching. These figures compare quite favorably with national surveys which have documented that more than one-quarter of full-time faculty in the United States have never published a scholarly work.[17]

The allied health graduates were active in professional societies and organizations. In the past year they organized symposia or conducted workshops three times at national meetings, compared to none by their MHPE peers in other professions. Two of the allied health graduates entered the program already demonstrating strong leadership in their respective professional organizations, serving on boards of directors and holding important offices. Both reported greatly increased participation and higher offices held after graduation. A third has since become a board member and office holder. One graduate assumed a major role in lobbying the state legislature for medical technologists, and another became chair of the body which accredits radiation therapy programs.

CONCLUSIONS

The revised Master of Health Professions Education Leadership program is relatively new, having admitted its first students at the beginning of 1983. This study represents the first phase of a long-term effort to monitor and judge the effectiveness of the program in meeting its goal of training leaders for health professions education.

On the basis of the data collected so far, it would seem that this goal is being met. Graduates previously not holding faculty positions now do, and those still in the field accepted responsiblity for the administration of educationl programs at various levels. Allied health graduates reported greater skill in teaching, better relationships with students, and increased understanding of educational theory and practice. They also reported the application of these skills toward the revision of curricula, which will hopefully result in an end product of better-trained health professionals. The directors of smaller, hospital-based programs reported the broadest and deepest changes of this nature, perhaps because of their greater autonomy in educational matters.

Allied health graduates cited the leadership components of the MHPE program as being of great value to them, and were more frequently engaged in projects which brought them into the political arena of their institutions than were their peers in the MHPE program. Economic factors affecting the entire health care industry were the impetus behind much of this activity, and the graduates cited their exposure to the political process, leadership styles and techniques, and training in group process as being a distinct advantage in dealing with these issues. While all professional groups value and use this training, only the allied health graduates actually were required to bring it to bear in such significant ways.

In terms of professional scholarship, allied health graduates' reports of their publishing and paper presentation records were quite remarkable and are clearly a result of the program, as much of their research was derived from work initiated while in the program. Leadership in professional organizations has also increased among the allied health graduates and, although this activity was not so clearly attributable to the program, it definitely seems to be enhanced by it. When MHPE allied health graduates are compared with those of graduates of other programs, such as the one at Baylor,[16] trends are comparable in terms of job placement, publications, and activity in professional organizations.

Do allied health professionals benefit from leadership training more than other professionals? A definite answer to this question will require monitoring graduates' careers over an extended period of time. However, allied health graduates are already far ahead of their MHPE peers in terms of scholarly and professional activities, and seem to become more quickly engaged in projects which have a significant impact on their institutions.

A recurring theme among all MHPE graduates was their realization that the issues and problems in health care and health professions education were similar for all groups, resulting in the diminishment of stereotypes and greater collegiality with other health disciplines. Certainly the allied health professions, often the initial target of cost-cutting measures and sometimes viewed as having less important functions in the health care hierarchy, in the long run will benefit from such changes in attitudes and increased interactions with other professionals. Also, participation in graduate programs, such as the MHPE and others noted here, gives allied health professionals the type of training that is useful in attaining and functioning in positions of leadership and equips them with the skills necessary to build more effective educational programs. Because many health care practitioners are thrust into positions of teaching and administration without formal training or even much experience in these areas, an overall increase in the quality of health porfessions education programs should result if persons with expertise are placed in such positions.

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RECRUITMENT OF MINORITY ALLIED HEALTH PROFESSIONALS: AN ENRICHMENT WORKSHOP BASED ON PROFILES OF SUCCESSFUL PRACTITIONERS

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ABSTRACT

The lack of visible, minority role models has been identified as a significant barrier to recruiting minorities in the health care professions. The problem is not so much a lack of minority role models, but difficulty in publicizing minority health professionals who are "successes" and facilitating mentor linkages between these practitioners and current minority health professions students. This presentation describes an enrichment workshop which profiles minority health professionals in administrative, teaching and clinical positions and provides the opportunity for linkages between students and practitioners. The recruitment strategy, an enrichment workshop, used a case study approach for explaining the various roles of allied health professionals. In addition, linkages were established among profiled successful practitioners, minority students currently enrolled in allied health programs, and students interested in an allied health career. Such efforts can effectively provide insight in career awareness and expectations of an emerging minority health professional.

INTRODUCTION

The dilemma of underrepresentation of ethnic minority students in the health professions has been voiced by a number of colleges, universities and professional organizations[1-3]. To diversify both the student body and the professions, there is a need to continue to develop effective recruitment and mentoring programs which will acquaint a larger number of minority students with the career opportunities in allied health.

The enrichment workshop, an awareness program in allied health, utilized a case study approach to explain the interdisciplinary roles of allied health professionals. This activity provided an opportunity for students to observe the relationships, the roles and the responsibilities of allied health professionals in providing patient care. The enrichment workshop expands on the use of role modeling/mentoring which has been identified as an effective and influential means of recruitment[4]. Profiles of minority alumni were used to enhance the enrichment workshop and provide additional role models for minority students.

METHODOLOGY

The focus of this study was two-fold. The initial step was to develop and implement an enrichment program using a three level team approach consisting of: 1) practicing allied health professionals, 2) allied health students, and 3) students interested in enrolling in an allied health program. The second step consisted of developing an exhibit of minority alumni profiles to inspire and model minority success in the health professions.

DEVELOPMENT OF THE ENRICHMENT PROGRAM

Development. The Enrichment Program was a collaborative interdisciplinary approach designed to disseminate information about selected programs in the School of Allied Medical Professions: Biomedical Communications, Medical Dietetics, Medical Illustration, Medical Records Administration, Medical Technology, Nurse Anesthesia, Occupational Therapy, Physical Therapy, Radiologic Technology and Respiratory Therapy.

The Enrichment Program planning committee included eight minority allied health practitioners (Level I) and five students currently enrolled in allied health programs (Level II). This committee, with the assistance of a physician, developed a hypothetical patient case history designed to show the interdisciplinary nature of the health care team. The patient description was designed so it related to the age group and lifestyle characteristics of the intended audience.

The Patient. Student: Debbie R., a 19-year-old black female, transferred to The Ohio State University her sophomore year. She had always been very athletic, although her participation in physical activities had decreased tremendously in recent months. Once at OSU, she decided to resume her activities in order to get in shape for gymnastic team tryouts.

Debbie began a daily physical workout. Because she felt overweight. She went on a crash diet without supervision. She began to lose weight, but also lacked the strength and endurance that she once had.

During an aerobic workout, Debbie fell backwards, fainted and twisted her knee. She was transported to University Hospital's emergency room where upon admission, the following physical findings were observed: fracture of right humerus with injury to the radial nerve and subsequent wrist drop. There was also ligamentous injury to the left knee which required surgical intervention.

IMPLEMENTATION OF THE ENRICHMENT PROGRAM

Minority health practitioners along with students enrolled in the related allied health programs collaborated to determine and design the course of treatment for this patient. The goal of this interdisciplinary team was the planning and development of a care plan to address each of the patient's problems. To illustrate the roles of health professionals, information booths were set up, using several instructional media including posters, kodachromes, lab test demonstrations, textbooks, instructional models and other appropriate visuals. These information aids provided a realistic picture of each allied health profession and aided in explaining diverse roles on the health care team. Roles and activities of team members included the following:

1. **Medical Technologist**: complete blood count, electolytes, blood gases, hemoglobin electrophoresis, blood glucose, BUN/creatinine

2. **Radiologic Techologist**: initial x-rays: chest, knee

3. **Respiratory Therapist**: maintain homeostatic function of patient's respiratory system, mechanical ventilatory support based on physiological data

4. **Nurse Anesthetist**: administer anesthesia during surgery

5. **Medical Dietician**: provide dietary information, caloric count

6. **Physical Therapist**: maintain range of motion, lower extremity strengthening, assist with mobility/gait training, prescribe ambulatory aids

7. **Occupational Therapist**: electrical stimulation for nerve injury, range of motion strenthening activity, adaptive activity aids

8. **Medical Illustrator**: prepare drawing and diagrams for patient information

9. **Biomedical Communicator**: patient information, including brochures, pamphlet, audio visual aids, and media programs.

A member of the planning committee introduced the case and gave directions for involvement of students and participants. Health care practitioners and enrolled students took their places by the exhibit depicting a specific area of practice. Recruits were encouraged to move from exhibit to exhibit to discuss contributions of the respective practitioners to development of the patient care plan and delivery of needed services.

Following individual exposure to all dimensions of the care study, administrators, practitioners, students and recruits convened in a general session to further discuss the case, offer new insights to team care, and evaluate the case study process.

ALUMNI PROFILES

A second dimension of the study was preparation of minority alumni profiles. A profile sheet (Appendix D) was sent to all minority alumni from the School of Allied Medical Professions. The questionnaire included demographic data, educational information, employment information and personal impressions of allied health. Profile sheets were returned from 41 individuals. Table I shows the overall employment status of minority alumni.

TABLE I

Present Employment

	N	%
General Hospital	12	29
Specific Hospital	7	17
Health Care Center	5	12
Public Health Agency	3	7
Private Office	3	7
Community Health	3	7
Student	3	7
Academic Institution	3	7
Health Club	2	4
Title in Current Position		
Clinician/Staff	18	44
Administrator/Supervisor	9	22
Student	6	15
Instructor/Professor	5	13
Dean	1	2
Psychiatrist	1	2
Unemployed	1	2
Employment Responsibilities		
Clinical Setting	22	
Education	19	
Administration	12	

Alumni were asked to share some words of wisdom for minority students who were planning to enroll in allied health professions. A sampling of these pearls of wisdom included the following:

- "Seek to enhance your marketability."

- "Take courses seriously, work hard in your internship."
- "Take as many management courses as you can."
- "Get involved in the other programs related to your major both inside and outside the classroom."
- "View your studies and continuing education as a continual building process. Maintain a sincere desire to help people. Don't succumb to the temptation to make money at the cost of your professional integrity."

Data on alumni were organized and mounted on heavy 8-1/2" x 11" posterboard, one person per sheet. The profile included a photo, name, allied health program, degree received, how interest was stimulated in his/her particular health profession, present position, job responsibilities, and words of wisdom for allied health students. All profiles were bound in a large loose leaf notebook for viewing and storage. Individual sheets of the notebook can also be removed for display on a larger exhibit board.

SUMMARY

Focusing on a single patient case history, the authors were able to demonstrate the interaction of allied health professionals in the treatment of a given patient. This approach demonstrates the importance of interdisciplinary health care.

The enrichment program, as presented, was well received. The interaction of allied health professionals, allied health students and those students interested in enrolling in an allied health program proved to be educationally beneficial. The career awareness and professional potential of the participants were enhanced as a result of cooperative efforts in presenting the enrichment program. Follow-up of students attending the workshop is in progress.

The collection of alumni profiles is an ongoing activity of the School of Allied Medical Professions in an effort to provide professional role models for minority students entering allied health careers.

Such efforts as presented here can effectively provide insight in career awareness and expectations of an emerging minority health professional.

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AN INTERDISCIPLINARY APPROACH TO THE DEVELOPMENT OF A NON-VERBAL COMMUNICATION PROGRAM

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ABSTRACT

Frustration regarding communication problems with non-verbal patients was the impetus for the development of a collaborative research project aimed at designing and testing a realistic and utilitarian system of non-verbal communication. Representation from those disciplines most frequently involved with the patients was felt to be essential to the development of a system which would consider the needs of the patients in their interactions with all of the staff. A literature review of previous attempts at training non-verbal communication revealed problems in implementation. The collaboration of representatives of several disciplines was seen as a way of overcoming these implementation problems. It was felt that the interdisciplinary aspect of this project strengthened the research design, ensured the involvement of team members necessary to implement the project, and enabled the project to have realistic carryover and utilizability for all staff working with these patients. Previous attempts to perform this type of research required the initiative and dedication of one individual who was seldom able to give up the amount of time needed due to demanding clinical schedules. The team approach also helped maintain a high level of involvement and interest in which different team members reinforced each other. This aspect of clinical research is frequently overlooked.

INTRODUCTION - AWARENESS OF PROBLEM

Not long after beginning to work with elderly patients, we noted the frustration of attempting to communicate with patients who had verbal communication problems. What was particularly frustrating was that several of the patients we initially came into contact with wanted very badly to communicate with us. They were obviously aware of what they wanted to say and demonstrated by their actions that they understood much of what we said. We pinned hopes on using writing, communication boards, or some sort of gestural signals as means of communicating. Many hours were spent working with one particular patient to teach him to use a typewriter. He was able to learn the position of the keys and could copy material from a Reader's Digest, but he continued to have difficulty spontaneously producing words and sentences, and it seemed that the major improvement in our communication was the result of my increased ability to understand his gestures and at learning to ask better yes/no questions. The frustration he felt was obvious and we often felt a similar frustration. We continued to work together and were devising better ways of communicating as we began to improve at interpreting his gestures and hand movements. We even contacted a nurse whose son was unable to hear or speak and discussed learning sign language. Despite our attempts, problems such as time constraints, the complexity of the American Sign Language (ASL) system, and the lack of widespread usability were obstacles to learning the system. In addition to these problems, the patient had an unfortunate accident and was discharged from our unit. In continued day to day work with elderly patients in a nursing home environment and on intermediate medical units, we became aware of the number of patients with communication difficulties and their frustrations with being unable to communicate. Several patients who had been institutionalized for long periods of time seemed to adjust to this situation by learning signs or gestures for some of their most important needs and then relegated themselves to solitary existence.

The following scenario seemed to occur with agonizing regularity. A new patient would be admitted to the nursing home. The patient's chart would reveal that he had a communication deficit, usually aphasia which was a residual from a previous Cerebrovascular Accident (stroke). The patient would be approached to make an initial clinical assessment. The patient would eagerly attend to questioning, and invariably, attempt to communicate something by making hand signals or gestures. The interviewer would try to guess what he wanted to communicate. If one was unable to decipher his gestures, he would become more agitated and frustrated and would frequently end up getting angry or crying. Even if one succeeded in understanding him, this would result in increased expectations and the patient would attempt to communicate more until we reached a point where we were unable to communicate and the interaction would end with extreme frustration.

Individuals living or working with someone who has a communication deficit often report similar feelings and occurrences. This situation encouraged seeking out the assistance of our hospital's speech therapist. Speech Therapy had frequently been requested to work with similar patients and had often had fairly good results. In subsequent discussions with the Speech Therapist, it seemed there was a group of patients who were either dysphasic or aphasic and the final attempt to communicate with them was the development and construction of a communication board. Despite the potential benefit of a communication board, these boards were both cumbersome and impractical. Staff seldom had time to wait until a patient could use the board to communicate and we never found a patient who used one of the devices on a daily basis. Speech therapy could work with the patients and sometimes did improve the speech production and quality of some patients. However, the outcome with many others was that the speech therapy time was an enjoyable social interac-tion in which the patient and the speech therapist were able to learn enough of the idiosyncratic gestures and utterances to communicate on a level that was certainly much greater than the limited communication the patient had with most others.

INTERDISCIPLINARY DISCUSSION OF PROBLEM

As the various professionals met in team meetings, it became apparent the communication difficulty was a problem for most of the staff members working with these patients. Nurses found the problem particularly frustrating since they frequently worked most closely with the patients on a daily basis. Some of their problems seemed rather crucial since they involved informa-tion about pain or medication issues. The original description of numbers and different types of patients with communication difficulties arose from this team discussion. The largest group was made up of patients who had suffered CerebroVascular Accidents (CVAs) and had residual aphasia. In addition, there were many patients who were dysphasic; that is, they were able to say some words but frequently their vocabularies were severely limited or they used inappropriate words and phrases. Another group of patients with verbal communication problems were patients with Parkinson's Disease or other cerebral dysfunctions. At this point, it was noted that several patients suffered primarily from hearing dysfunctions, but that they had many of the same problems of communicating with the staff. Although they could tell you when they had problems, two way communication was often difficult. Thus, we became aware of a situation that seemed to warrant action.

EXTENT OF THE PROBLEM

Although we were aware of the national statistics on the number of Americans with strokes and the increase in this problem with the increase in the number of elderly, we were primarily concerned about those patients we worked with on a daily basis. An informal review of the patients in a 120 bed nursing home revealed that 28 of them (24%) had a severe communication deficit and were similar to the first patient described. (The percentages are slightly elevated because they were calculated on the actual number of patients (117) in the nursing home at the time of the survey). Fifteen of these patients (13% of the total nursing home population) had CerebroVascular Accidents (CVAs) that primarily affected their left Cerebral Hemisphere and was the cause of their communication problem. The next largest group of 7 patients (6%) had no major neurological disorders but were primarily Hard of Hearing (HOH) to the extent that it was impossible to communicate with them even with the use of hearing aids. The rest were smaller subgroups of patients suffering from Parkinson's Disease, Huntington's Chorea, Multiple Sclerosis, or Dementia. Informational discussions with nursing staff from other units in the medical center suggested that they had similar percentages of patients with communication disorders and elicited spontaneous comments about the frustration of dealing with this problem.

A CLINICAL TRAINING PROGRAM OR A RESEARCH PROGRAM

This team discussion led to exploration of ways of resolving this problem. A meeting was scheduled and representatives from those disciplines most involved with the day to day interactions of the patients were present. The disciplines represented included: Nursing, Rehabilitation Medicine (Occupational and Corrective Therapists), Speech Therapy and Psychology. It was suggested that we review the literature to explore previous attempts to deal with this problem. Pamphlets about aphasia which were available from the American Heart Association stressed the importance of speech therapy and improved listening skills for family members working with aphasic patients. Our review of the professional literature made it obvious that there was a need for research and development in this area. We found that several authors had attempted to devise nonverbal hand signals and communication systems to train aphasic patients to communicate. Several of these attempts appeared to be fairly useful but never widely used.

At this point, we discussed the pros and cons of developing a Clinical Training Program versus a Research Program. The development of a Clinical Training Program would seem to fill our needs. However, it became apparent that communication also involved other issues such as the potential for increased self care by the patient, increased satisfaction with visitors and family members with whom patients could communicate, decreased depression and isolation and perhaps generalization to other areas, such as, increased involvement with other patients and ward activities. The advantage of designing a Research Program would be the increased tendency to formally write up the program, describe the procedures used and to investigate the effects of the program on other factors such as depression and social interaction with others. The obvious disadvantage was the amount of time required to set up the program and the requirement of staying with specific protocol. Weighing these factors, the team decided to invest the time and effort and make the project a formal research program. The staff also felt that, if successful, the program could be used on other units in our Medical Center and even projected development of a system which could have potential utility in other V.A.'s and Community Long Term Care (LTC) facilities.

LITERATURE REVIEW

Many of the studies found during our literature search were involved in research aimed at determining the nature of verbal communication problems. These studies fell into three major areas:

1. Studies focused on determining the extent of communication disorders and relationship between these disorders and other cognitive functions;

2. Studies focused on testing the theory of a unitary communication system disorder versus independent cerebral mechanisms for different types of communication, i.e. written versus verbal; and,

3. Studies aimed at developing and evaluating the efficacy of non-verbal communication systems.

These various areas are related since the development of alternate communication systems depends upon the nature of communication deficits and underlying neural mechanisms. The debates, however, are often quite esoteric and theoretical and have little to offer in terms of clinical treatment approaches. Many Clinical Neuropsychologists are now emphasizing the importance of describing specific deficits rather than postulating underlying mechanisms. With these factors in mind, we undertook a review of the literature.

Those studies which investigated the various interrelationships between intellectual tests or tests of aphasia and the aphasic characteristics of the patient were not considered significant to the task of developing a functional communication system and were not included in the present paper.

The second set of studies, however, included a considerable portion of the literature in the area of aphasia. These studies were concerned with the relationship between communication and the ability to form associations, interpret verbal and non-verbal signals, and conceptual ability. A number of studies (Duffy & Duffy, 1981; Duffy, Duffy & Pearson, 1975; Gainotti & Lemo, 1976; Varney, 1978; and Duffy, Duffy & Mercaitis, 1984; Duffy & Watkins, 1984) have focused on the fact that aphasic patients have deficits in the recognition and expression of pantomimic gestures when compared with normal controls and right hemisphere damaged patients. These studies have generally found that there are significant differences between aphasic patients and various control and comparison groups. However, a closer evaluation of the studies also revealed that left hemisphere damaged aphasic patients have substantial intact gestural recognition and expression skills (Feyereisen & Seron, 1982). Although it is important to determine the extent of central symbolic deficits in aphasic patients, there is substantial evidence that aphasics can utilize manual or pantomimic systems with varying degrees of efficacy. In a major review article, Christopoulou & Bonvillian (1985), concluded that "Many aphasic individuals who fail to reacquire spoken language skills may retain the ability to acquire aspects of a manual communication system" (p.1). Even major advocates of the Central Deficit theory (Duffy & Duffy, 1981; Gainotti & Lemmo, 1976), admitted that aphasics do have considerable recognition skills remaining and that evaluation of the pattern of errors of aphasics demonstrated problems in semantics, not problems in understanding. In the study by Gainotti & Lemmo (1976) for example, 20 of their 53 aphasic patients made no errors on a test of gestural comprehension and another 10 patients made only one error. Thus better than half (57%) of these aphasic patients demonstrated excellent gestural recognition skills. Other authors have reported similar results (Daniloff et al., 1982; Duffy & Duffy, 1981).

PREVIOUS ATTEMPTS TO DEVELOP NONVERBAL COMMUNICATION PROGRAMS

The present review of the literature also made it clear that there had been several previous attempts to develop systems of non-verbal communication for aphasic patients (Chen, 1971; Eagleson, et al., 1975). These studies generally found that non-verbal patients (often stroke patients) were able to learn and utilize an alternative system of communication.

It is significant that the majority of studies found that non-verbal patients can and do learn to communicate and comprehend through gestures, hand signals and pantomimic expression. This appears to be true despite the fact that some of the systems used were quite complicated (Gardner, et. al., 1976). For example, Gardner's system utilized cards with symbols. These cards could be used to communicate needs or be strung together to form sentences for more complex interactions. Although the patients were able to learn and utilize this system, it appeared to have some of the same deficiencies as communication boards and written material. Much of the interest and impetus has shifted toward gestural communication and there are reports of successful programs to use hand signals (Chen, 1968; Chen, 1971) or signs based on American Indian Sign Language (Skelly, et. al., 1975; Skelly, 1979). Still the major difficulty with these studies appears to be the utilitarian value of the results. Systems developed appeared to function for a short period of time or for those few individuals trained to use the system, or there seemed to be flurries of interest in certain institutions or areas of the country.

For these reasons, a functional system of non-verbal communication appeared to be much needed. The present paper will not describe the program itself but will emphasize the contributions of the team approach to this particular research program.

INTERDISCIPLINARY TEAM CONTRIBUTIONS TO THE PRESENT RESEARCH

The rationale for an interdisciplinary approach has already been mentioned but it might be helpful to review those reasons in more detail.

INCREASED COOPERATION AND INVOLVEMENT OF STAFF IN PROGRAM

One reason for the failure of good programs to be widely utilized is the exclusion of those individuals who are most responsible for the successful implementation of the programs. As researchers, we were made aware of the attitudes of non-research staff toward the "elite" researchers and their programs. These programs were usually the brainchild of a single researcher or career scientist whose interest sparked the specific research program. More often than not, the research resulted in increased workloads for staff members with already full schedules. Reluctance to cooperate, passive resistance, and even hostile refusal were not rare occurrences. This is not a conducive atmosphere for obtaining positive results in human service situations.

Even assuming that the original research situation managed to overcome these problems, attempts to implement the program in other settings with less involved staff could undermine the efficacy of the program. The involvement of staff from the major disciplines working with the patients helps to overcome this reluctance and lack of involvement. In addition, the impact of members of different disciplines can be assessed and taken into account prior to the implementation of the program.

INCREASED LIKELIHOOD OF ADDRESSING A SIGNIFICANT NEED

Another factor of the interdisciplinary approach is that the research has a greater likelihood of being based on real need. The impetus for the research and development comes from those clinical staff working with patients on a daily basis. The reality of the need was clarified by subsequent discussions with members of other disciplines. As such, this project is more likely to meet a real need than investigator initiated programs or even investigations based on needs assessments. Although needs assessments are often an improvement over investigator initiated programs, even here the number of specific issues addressed may not reflect real life issues. The same problems that occur with program implementation (staff interest, time, real problems, etc.) can adversely affect needs assessments. Inclusion of staff from different disciplines also increases the potential of addressing a realistic problem of high need for the patient population being investigated.

RATIONALE FOR SPECIFIC DISCIPLINES INVOLVED IN THE PRESENT STUDY

Nursing is frequently the largest group of staff working with aphasic patients and they have a need to communicate accurately and quickly with patients. In addition, nursing staffs' willingness to utilize a program is one of the most important factors in increasing the likelihood of success. Nurses or Nursing Assistants are quite aware of the day to day communication problems of aphasic patients. Probably more than any other discipline, nursing could attest to and clarify the types of situations and communications that were most frustrating for the patients. As such, the inclusion of nurses was felt to be a critical component of the design of the research program.

Speech Therapy was the second discipline specializing in the evaluation and treatment of communication problems. Some could argue that speech therapists are more important than nursing personnel in an attempt to develop a nonverbal communication program, and arguments could be advanced for the primacy of each discipline. We felt that each discipline was important and that any missing area would result in a weakened program. Speech therapists provided expertise in measurements and clarification of communication problems. Our speech therapist was also familiar with signing systems and alternative nonverbal communication systems.

Rehabilitation Medicine Department including Occupational Therapy, Corrective Therapy, and Physical Therapy worked closely with the patients and in our case provide the logistic capability to carry out the program. Rehabilitation Medicine also provided expertise in measures of functional abilities to complete activities of daily living.

The Psychologist was knowledgeable about research design and served to coordinate the contributions of the other investigators. He was also familiar with some of the tests of emotional and psychological factors that might be affected by this program. Thus, he helped to choose measures of depression and staff attitude.

Other staff could also be included in the program and each setting will have to vary the disciplines included based on availability and interest. For example, few long term care facilities have the availability of a Psychologist or researcher, and members of other disciplines might have to fill this position. Other disciplines that frequently interact with non-communicative patients include: Medicine, Social Work, Psychiatry, Dietetics, Recreation, and Chaplaincy.

It was hoped that in the present situation, the program eventually designed could be utilized by any of these other services without extensive training and that the number of staff involved could mediate and "translate" for other staff until they learned enough of the system to begin to use it.

Another advantage of the interdisciplinary nature of the research team became apparent shortly after the team met to discuss the project. It became apparent and somewhat sobering to realize that each discipline had its own body of literature. In most research projects only one discipline is involved and the literature frequently reflects the sources known to and available to that individual. Computer searches are helpful but even computer data bases available to the major professional search resources must limit the journals and resource material which form the data base. As a psychologist, the usual literature review, trip to Psych Abstracts, and a computer search from our library revealed a lack of material on non-verbal communication training. The few articles actually found, tended to reference a body of information that was quite limited. The speech therapist, however, found a wealth of literature pertinent to our questions and was soon overwhelming the rest of us with articles to read. Although we were not naive about this aspect of research, the significance of the limitation became obvious during our literature review. Similar insights occurred when specific tests, treatments and evaluation materials were discussed.

DISADVANTAGES OF THE TEAM APPROACH

There were some disadvantages to the use of a research team made up of members of several disciplines. Although a team can function cooperatively most of the time, conflicts can and do occur. Resolution of these conflicts requires more time prior to actual program implementation. An obvious effect is the increased time required to complete the project. That should be evident in this presentation. Rather than being able to present results, the development and structure of the project are discussed. Some of the problems encountered included: scheduling meetings and when the members can juggle their various schedules to attend, the duplication of effort at times, and the necessity of keeping all members informed of the progress of individual members.

It also helps to have someone responsible for the overall coordination of the project. During discussions of various members' roles, there can be overlap and gaps. Coordination and human relations skills are helpful at this phase and even crucial to the integrity of the project. We resolved these issues by being honest with each other and being willing to compromise to insure the completion of the project.

Despite our team efforts, implementation and a carry over at the grass roots of the project can still be a problem. Even though the major professional disciplines are represented, all of the staff expected to cooperate and be involved in the project cannot be included in the planning phase. Still this problem is less severe than in single investigator initiated and implemented projects.

In summary it is felt that this approach increases the likelihood of working on a significant problem, applies a networking umbrella to research, informs the major parties involved, increases coordination, produces a superior literature review and awareness of past work, and provides a basis for increased likelihood of the generalization and utility of research results.

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PART III

CLINICAL RESEARCH STUDIES

This part of the Symposium included four presentations in which clinical research studies were described:

Autologous Transfusion: An Interdisciplinary Program of Blood Conservation

Effects of General Health and Oral Hygiene on Oral Health

The Vestibular and Visual Systems Bases of Learning Disorder

Effect of Local Hydrocortisone Phonophoresis on Serum Glucose and Cortisone Levels in Mice

AUTOLOGOUS TRANSFUSION:
AN INTERDISCIPLINARY PROGRAM
OF BLOOD CONSERVATION

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ABSTRACT

Autologous blood salvage and autotransfusion is an integral component of a blood conservation program. Autologous transfusion has received increasing support from health care professionals as a cost-effective adjunct to the homologous transfusion of bank blood. The advantages of autologous transfusion include an ultimate reduction in the adverse reactions associated with homologous blood transfusion, notably the reduction of infections such as viral hepatitis and AIDS. Because of their scope, programs of autologous transfusion involve the efforts of an interdisciplinary team. Ideally programs involve the joint efforts of surgeons, anesthesiologists, blood bank physicians, circulation technologists, nurses and medical technologists.

This report will summarize data from a survey of current autologous transfusion procedures and policies in hospitals serviced by the Central Ohio Regional Blood Services of the American Red Cross. Data from this survey address the following areas: (1) Extent of program; (2) institutional policies regarding storage of autologous products; (3) procedures for patient indentification; (4) equipment used for salvage and/or processing of autologous product; (5) types and amounts of anticoagulants used, as well as tetration procedures; (6) responsibility for administration of the program; (7) mechanism for review of the autologous program; (8) perceived effect of the autologous blood program on the utilization of homologous bank blood; (9) routine laboratory tests used to monitor autologous transfusion; and (10) policies regarding the routine infusion of blood components during autotransfusion.

This overview of current practice patterns will provide: (1) A data base of current information which will serve as a tool in the education of medical professionals regarding the role of autotransfusion in patient care and blood conservation; (2) a groundwork for the establishment of standards of practice that will help insure the safety and efficacy of the autotransfused blood product.

INTRODUCTION

Public issues with regard to the safety and adequacy of the nation's blood supply, along with increasing demands for more cost-effective medical care delivery have intensified efforts to identify effective mechanisms for blood conservation. Methods of blood salvage and autologous transfusion have received increasing support from health care professionals as a cost-saving adjunct to the transfusion of homologous bank blood[1].

AUTOLOGOUS TRANSFUSION GOALS

Autologous transfusion is defined as the reinfusion of the patient's own blood. This can be accomplished by two general methods: predeposit of autologous units for storage and reinfusion; and the salvage of blood-containing fluid that would ordinarily be discarded with subsequent processing and reinfusion[2]. Both approaches to blood conservation have as their ultimate goal a decrease in the number of donor blood products transfused. Both programs are part of any overall institutional program of blood conservation.

The primary goals of any autologous transfusion program include: a reduction in the complications associated with homologous transfusion; and overall conservation of the bank blood supply; cost-containment and improved quality of care[3].

Decreased utilization of homologous blood would subsequently result in a reduction in transfusion related complications such as hemolytic reactions, febrile and allergic responses, alloimmunization, acute hypothermia and the transmission of disease[4]. Perhaps most important of these would be a reduction in the incidence of post-transfusion hepatitis. It has been estimated that 8-10% of transfused patients develop hepatitis, and that 10% of these patients develop cirrhosis. This accounts for 240,000 to 300,000 cases of post-transfusion hepatitis per year[2].

AUTOLOGOUS TRANSFUSION PROCEDURES

Autologous transfusion programs can include one or more of a number of salvage and transfusion practices. Current practices include predeposit programs(2,3,5), perioperative phlebotomy with concurrent hemodilution[2,3,7,8], intraoperative salvage[2,3,9] and salvage from mediastinal drainage[2].

Predeposit programs involve the elective withdrawal of a patient's blood for storage and subsequent reinfusion. Predeposit programs are safe and effective, but have a number of disadvantages including administrative complexity. In addition, the patient must be sufficiently healthy to donate, and the blood loss must be predictable.

Perioperative phlebotomy with concurrent hemodilution refers to the practice of removing blood prior to surgery. Fluid loss is usually replaced by colloid or crystalloid therapy creating an isovolemic anemia[3,9]. Dilution to 20% hematocrit is standard for cariopulmonary bypass[2]. Blood thus salvaged is available for reinfusion at the termination of surgical blood loss. Perioperative phlebotomy has as its advantages speed, safety and improved physiological performance during surgery. The technique is contraindicated in the patient who cannot respond with increased cardiac output[10].

Intraoperative salvage involves the salvage of blood-containing fluid from the surgical site for subsequent reinfusion. Surgical salvage is relatively simple, safe, and low cost[2]. Salvage and reinfusion can be accomplished rapidly. Disadvantages include potential contamination, and difficulties with the titration of anticoagulant.

Salvage of mediastinal drainage involves the collection of blood-containing fluid from a chest tube. Reinfusion of mediastinal drainage has been demonstrated to be simple, safe and cost-effective. In addition, blood thus collected is defibrinogenated, and further anticoagulation is unnecessary[2,11].

Because of their scope, programs of autologous transfusion involve the cooperative efforts of an interdisciplinary health care team. Ideally such programs involve the joint efforts of surgeons, anesthesiologists, blood bank physicians, circulation technologist, nurses and medical technologist. In order to effectively administer an autologous transfusion program, involved health care professionals must develop communication/administration structures. Safe, effective autologous transfusion programs require effective communication with regard to:

a. the specific goals of the program
b. administrative responsibility
c. implementation
d. program formative and outcome evaluation
e. policies and procedures
f. analysis of cost-effectiveness
g. questions of efficacy and risk

In an attempt to provide standards of practice for autologous transfusion, the American Association of Blood Banks addressed these issues in their most recent edition of "Standards for Blood Banks and Transfusion Practices"[12]. These standards provide fairly detailed guidelines for predeposit programs which have traditionally been the responsibility of the transfusion service. The standards provide only rough guidelines for interoperative salvage, and fail to address perioperative/hemodilution and/or mediastinal drainage procedures.

In order to assure continued development of autologous transfusion as coordinated, clinically effective and economical programs, data are necessary regarding the current state-of-the-art of these procedures. At present the literature does not include a compilation of such information.

SURVEY RESULTS

In an attempt to describe the current practices in autologous transfusion, the author carried out a written census of those hospitals served by a regional Red Cross blood center. This census was conducted in order to address the following:

1. The extent of autologous blood programs in the institutions surveyed.
2. A description of collection and reinfusion procedures.
3. Information with regard to policies for storage, anticoagulation, patient identification procedures, etc.
4. Data regarding the routine laboratory values used to monitor patient status during autologous transfusion.
5. Information with regard to program administrative structures.
6. Opinions concerning the impact of autologous programs on the demand for bank blood.

Thirty-eight institutions were surveyed. Thirty-one (82%) responded. Of the respondents 12, (39%) indicated that they did participate in an autologous transfusion program. Among the twelve participating institutions all twelve participated in predeposit programs, three (25%) had perioperative/hemodilution programs, seven (58%) participated in intraoperative salvage and three (25%) salvaged blood from mediastinal drainage (Figure 1). Participating hospitals varied in size from 110 to 1000 bed (mean = 410 beds) (Figure 2). Administrative responsibilities for autologous programs varied between hospital and between programs. Most predeposit programs were the administrative responsibility of clinical pathology, while surgery and anesthesiology were singly or jointly responsible for most other programs.

Procedures and policies with regard to collection, processing, storage, administration and patient identification varied. Predeposit programs were more uniform with regard to procedures and policies, and yet, a number of differences were reported. Most predeposit programs utilized the central blood center for blood collection and storage. Two institutions, however, collected autologous units in-house. All programs provided liquid storage facilities while three had additional facilities for frozen storage. While many institutions made these blood products available for homologous transfusion, nearly 25% did not.

Even more variability was reported with other types of autologous programs. Most notable were variations with regard to storage, processing and patient identification. Storage requirements varied with regard to temperature (refrigeration to room temperature) and time (one hour to six hours). Many institutions had no established policies with regard to storage. Patient identification and unit labeling ranged from the most

Figure 1 Autologous Programs

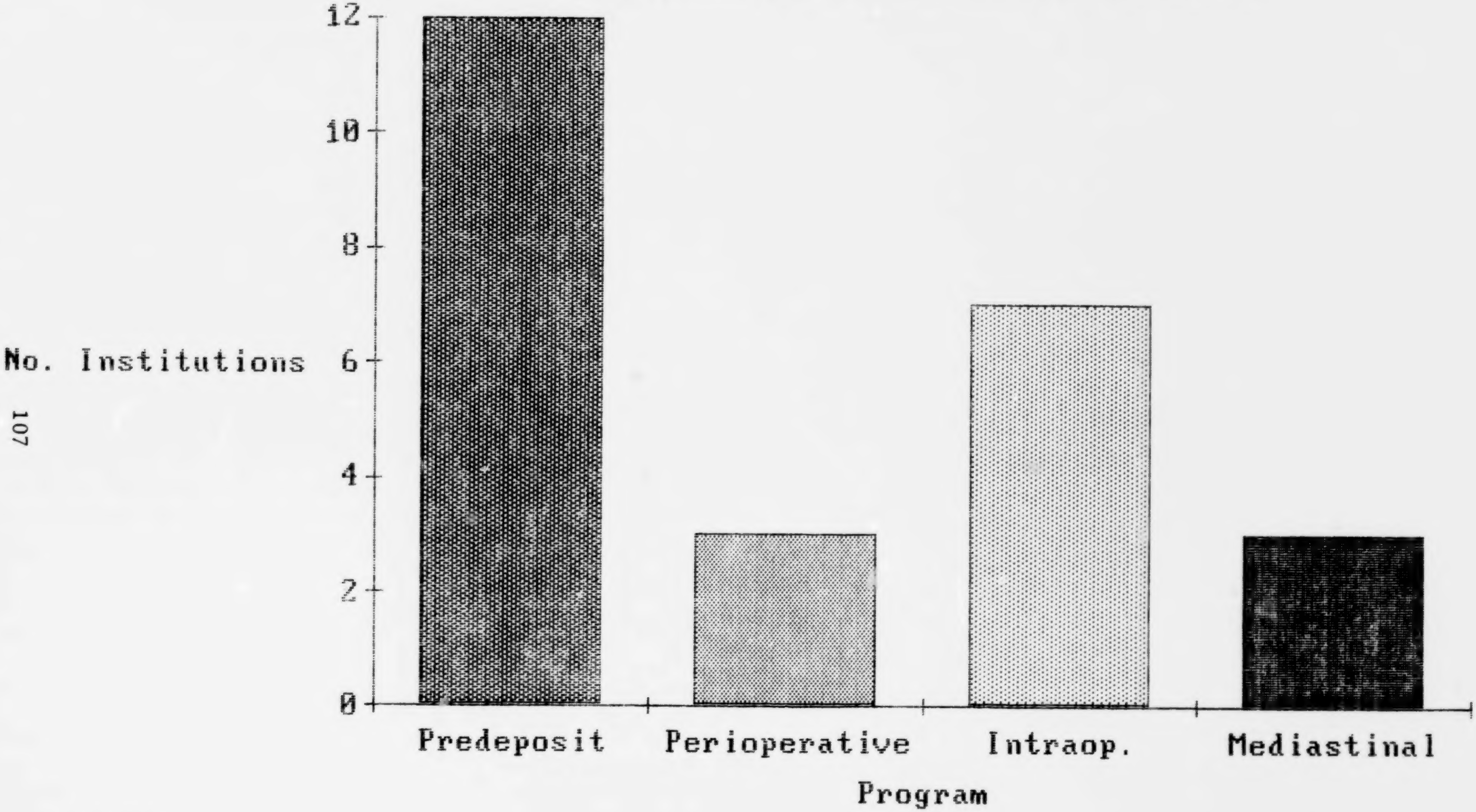
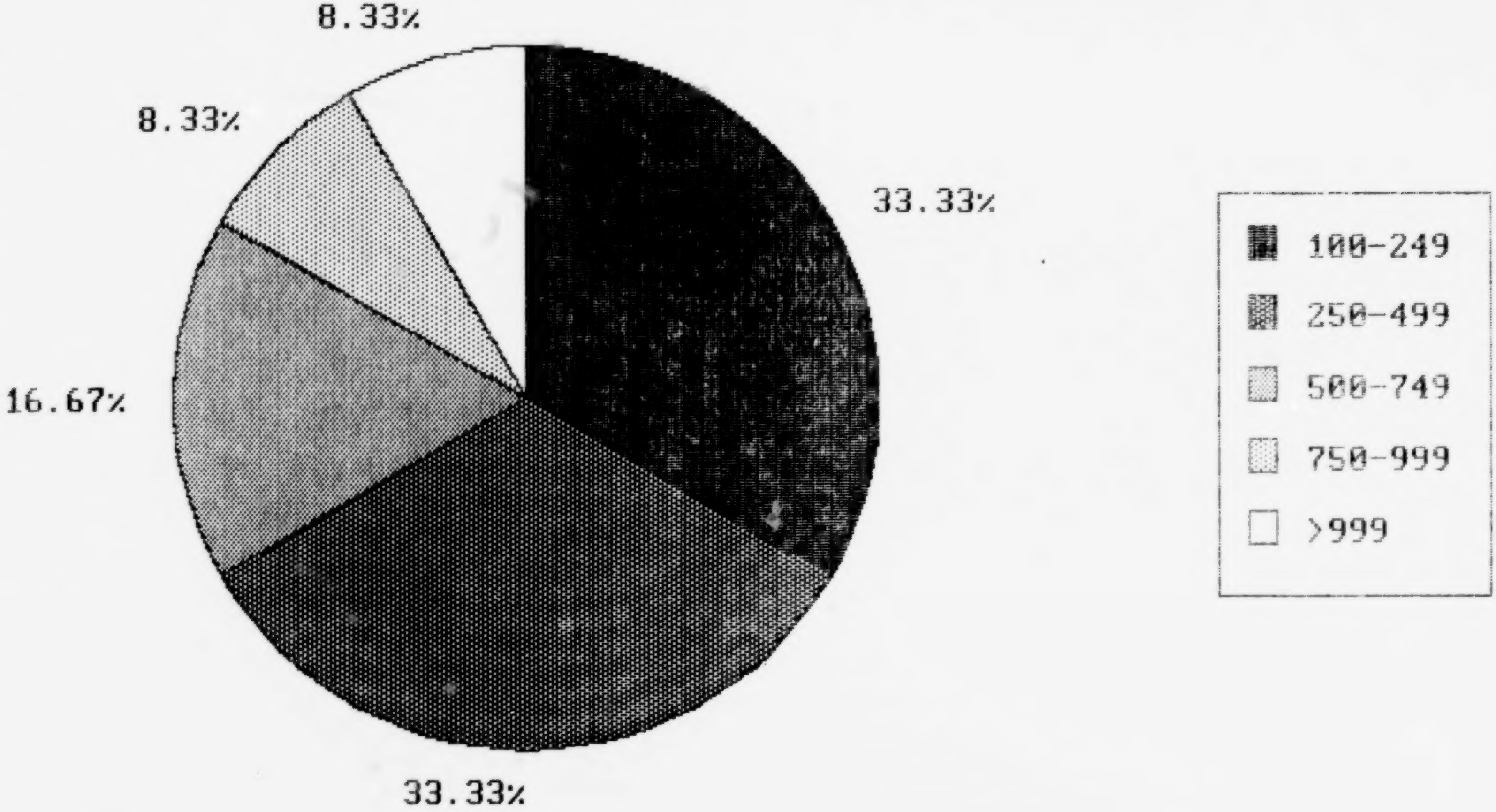


Figure 2 Institution Bed Size



extensive (patients first name, last name, hospital number, date, time and perfusionist) to no label at all (>30%).

Eight institutions reported that autologous transfusion programs were reviewed by the Transfusion Committee, two reported no peer review process and one reviewed predeposit but no other autologous programs.

Routine laboratory testing varied considerably. Seven institutions had no routine laboratory testing policy. Others reported routine profiling to varying extents aimed primarily at providing an assessment of patient hemostatic status.

Of those participating, five indicated that autologous transfusion had decreased the demand for bank blood, five reported no change and three had no opinion.

Whereas, more hospitals reported having predeposit programs, intraoperative salvage accounts for more actual cases. Average cases per reporting institution were as follows: (Figure 3)

predeposit	61
perioperative	50
interoperative	164
mediastinal	46

Autologous transfusion was utilized by a number of hospital departments. The distribution of programs by hospital department were as follows: (Figure 4)

Orthopedic Surgery	8	(67%)
Cardiac Surgery	7	(58%)
Plastic Surgery	7	(58%)
OB/GYN Surgery	7	(58%)
Trauma	7	(58%)
Oral Surgery	2	(17%)
General Surgery	1	(8%)
Urologic Surgery	1	(8%)

CONCLUSIONS

Despite the fact that medical professionals have identified safe and cost-effective methods for autologous transfusion, many institutions have yet to incorporate these procedures. This may be due to a lack of communication among transfusion service professionals with respect to the advantages of autologous programs. It is evident from the data presented, that these precedures can be utilized in trauma as well as in numerous surgical procedures. Further dialogue concerning the planning, implementation and cost-effectiveness of such programs may serve to increase their utilization.

Data also indicate that few standards exist with regard to procedures and policies of autologous transfusion. Further collaboration is necessary in order to define acceptable standards of practice that would assure uniform, safe and

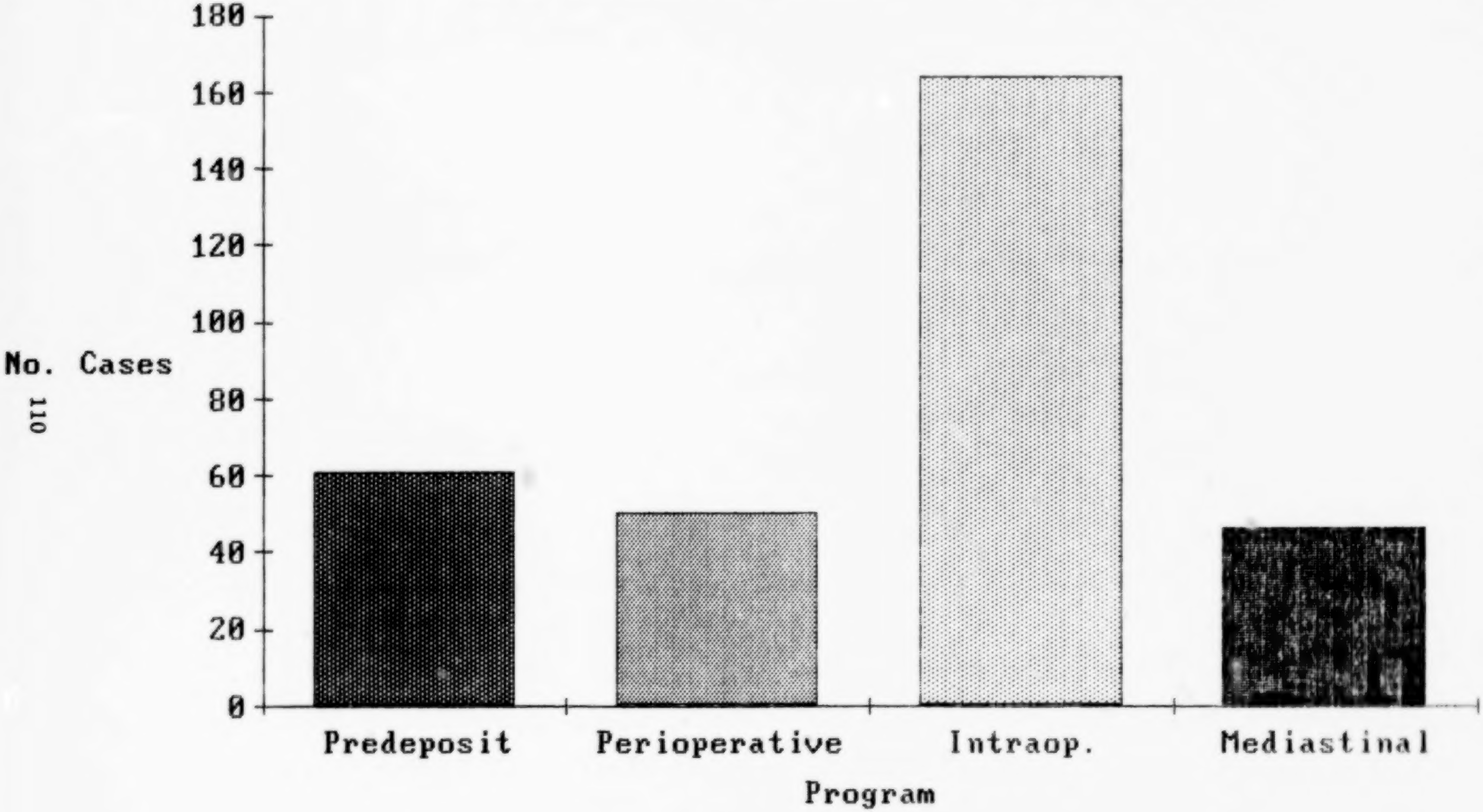


Figure 3 Average Cases Per Institution

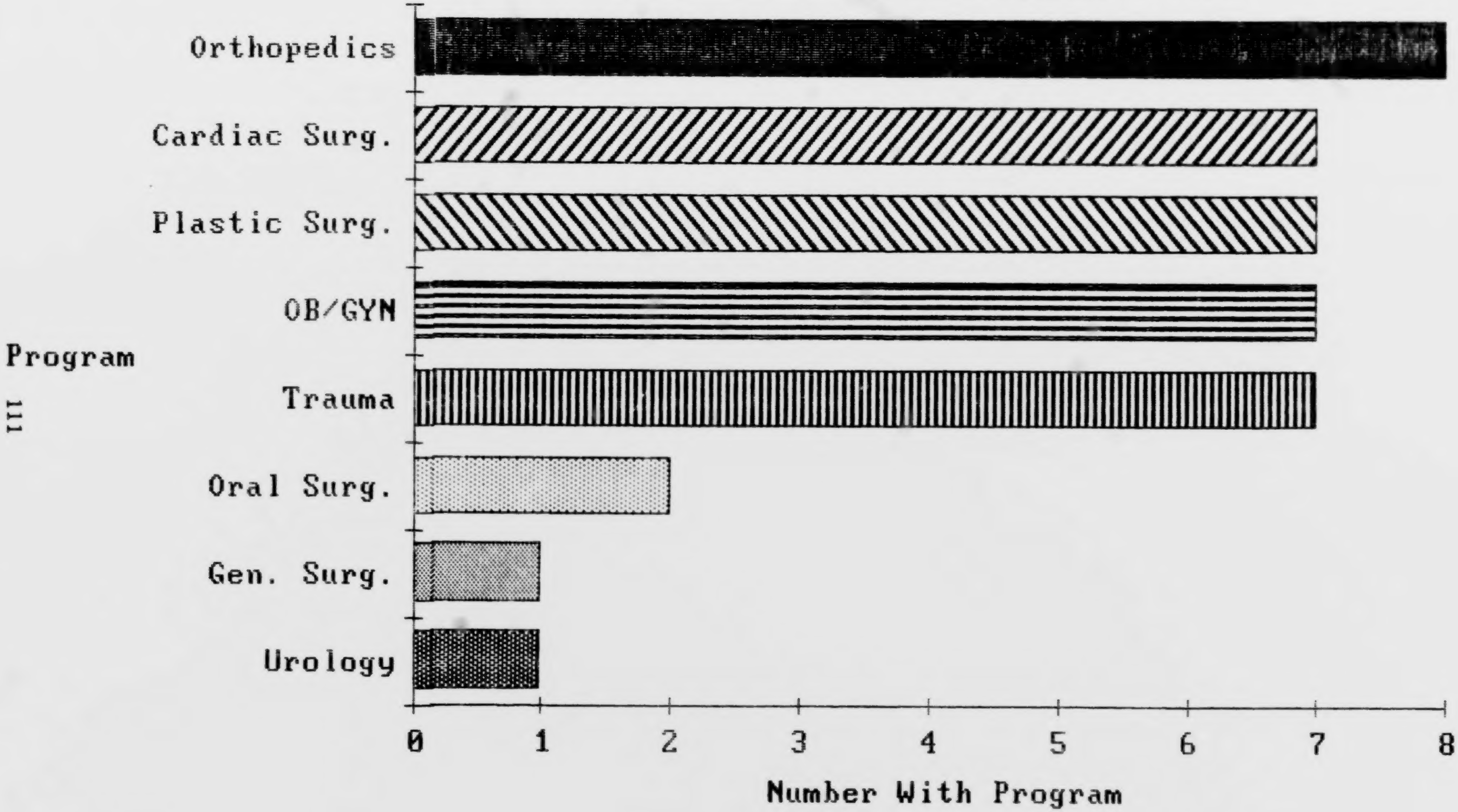


Figure 4 Programs/Hospital Dept.

efficacious outcomes.

Additional research data is needed in order to:

1. Determine optimal storage temperatures and time periods for salvaged blood-containing fluids.
2. Determine the hematological and hemostatic outcomes of salvage and autotransfusion and determine if a need exists for routine administration of herterologous components.
3. Assess the cost-effectiveness of autologous transfusion programs in various settings.
4. Gather data with regard to the effectiveness of autologous transfusion in:
    a. decreasing the demand for heterologous bank blood
    b. decreasing the rate of adverse reactions associated with transfusion
    c. saving lives

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EFFECTS OF GENERAL HEALTH AND ORAL HYGIENE ON ORAL HEALTH

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ABSTRACT

The purpose of this study was to assess the effects of general health and oral hygiene on oral health. Dental professionals tend to focus on oral conditions without considering general health, whereas medical professionals often ignore intra-oral factors. If general and local factors do have a significant effect on oral health, both must be considered in studies of oral health.

The independent variables were plaque score on the Silness and Loe Plaque Thickness Index and the presence of medical conditions or medications which effect bleeding or healing. The dependent variable was score on the Papillary Bleeding Index (PBI) of Muhlemann. Subjects were 37 adult clients in a private dental practice. They completed a medical history form which was a collaborative effort between a nurse and dental hygienist. Plaque and PBI scores were assessed by a dental hygienist using a Hu Friedy Williams periodontal probe.

Effect of plaque and medical history on total PBI score was analyzed using a 2x2 ANOVA. The main effect of plaque was significant (F=4.39, df=1,33, p<.05). Subjects with high plaque scores had significantly higher PBI scores, regardless of responses on the medical history. The effect of medical history responses approached statistical significance (F=3.98, df=1,33, p<.075). Subjects with positive responses on the medical history had more bleeding points than those with no positive responses, regardless of the amount of plaque. Multiple regression was used to analyze scores for 562 tooth surfaces. The correlation between PBI and plaque was .33 (p<.001). When the effect of medical history was added, multiple R increased to .49(p(.001). Plaque alone accounted for 11% of the variance in PBI score, whereas plaque and medical history together accounted for 24% of the variance.

General health and oral hygiene significantly effected oral health. Research on oral health must consider local and general systemic factors. The expertise of both medical and dental professionals should be utilized.

INTRODUCTION

There is a complex interaction between general health and the health of each part of the body. Oral health is effected by both systemic and local factors. Oral health in turn effects overall health. Infection of the supporting structures of the teeth can become a locus of chronic infection. The potential of these infections spreading systemically is rare for the healthy person, but can become life threatening to those whose immune systems are compromised. Almost all of the microorganisms indigenous to man can be found in the oral cavity. Pathogenic organisms can spread from the oral cavity to any part of the body.[1]

General health and nutritional status are dependent in part on the condition of the teeth and gums. Without teeth, the risk of choking on improperly chewed food increases. Food choices become limited, resulting in nutritional deficiencies which may cause lowered hemoglobin and Vitamin C levels.[2] General health begins to suffer.

General health effects the health of oral tissues, particularly the gingiva. The extensive blood supply of the gingiva makes that tissue extremely responsive to medical conditions or medications which effect bleeding or healing. There are approximately fifty capillaries per square millimeter in the oral aspect of the gingiva.[3] This vascularity makes gingival tissues particularly susceptible.

Colonization of bacteria on the teeth to form plaque is the major local factor affecting gingival health. The relationship between plaque and gingival health has been well documented. The first experimental research demonstrating the effectiveness of oral hygiene procedures against gingivitis in 1965[4] has been replicated numerous times with similar results. Subjects with healthy periodontal tissues developed gingivitis within three weeks of stopping oral hygiene measures. When allowed to resume tooth cleaning, the tissues became healthy again in approximately one week.

The health of the gingival tissue is assessed by dental professionals using ten parameters including color, consistency, bleeding and sulcus depth.[5] "Recent investigations have indicated that bleeding appears to be a parameter which can be relied upon to detect current histopathologic, clinical and bacteriological changes associated with periodontal disease."[9]

Bleeding upon probing is a more valid assessment of daily oral hygiene than plaque is. The amount of plaque found at any one time does not show the frequency or thoroughness of an individual's usual oral hygiene practices, it merely shows how much plaque has formed since it was last removed. Plaque begins forming within minutes on a clean tooth surface, and is potentially pathogenic after twenty-four hours.[10] Plaque is extremely adherent, and requires mechanical cleansing, like brushing and flossing, for removal. Instruction in oral hygiene has long been a responsibility of dental hygienists.[11-13] Dental hygienists have been viewed as the "critical element in the global scheme of preventive periodontics," and "are even more appropriately trained to provide preventive periodontal therapy than dentists."[14]

NURSING AND DENTAL HYGIENE

The collaboration of nurses with dental hygienists is a natural association. There is an increasing emphasis on oral self-care as the major method of preventing oral disease. With the increasing involvement of nursing in the maintenance of health in the community setting, methods of providing dental health education are becoming of interest to nurses as well.

The focus of nursing is to assist persons to attain or maintain optimal health through self-care. Assessing oral health and teaching oral self-care are addressed in the nursing literature and have always been within the scope of nursing practice. Bersani and Carl[15] state that nurses must teach patients how to care for their own mouths so they can assume as much of their own self-care as possible, thus preventing future problems and promoting comfort. "Oral assessment will also provide an opportunity for the nurse to help the patient understand the importance of oral care and the basic concepts of preventive dentistry."[16]

Traditionally, the emphasis of nursing has been oral care of the sick. A review of the nursing literature over the past five years revealed that oral care of the ill was addressed almost half the time. The remaining articles were mainly "how to" articles, describing methods of giving oral care to the well population. Occasionally the methods advocated were not in agreement with those recommended by dental hygienists.

Dental hygiene literature and dental hygiene care had focused primarily on healthy persons. The emphasis in the literature on periodontal disease has been on the role of bacterial plaque. Systemic diseases and their treatment, however, also effect the gingiva. Drugs, chemotherapy, disorders of the clotting mechanism and chronic disease effect the oral tissues in varying degrees. Persons with any medical condition which increases susceptibility to the effects of microorganisms or decreases the ability to heal have poorer oral health than normal individuals.[5,17-18] Within the past decade, dental hygienists have become more concerned with medically compromised patients. Individuals who formerly were treated by dentists and hygienists only in hospitals are now receiving that same care in dental offices.[19] Dental hygienists must learn more about the medical status of patients and how that effects oral health.

The areas of emphasis for dental hygienists and nurses are overlapping, yet collaborative efforts between hygienists and nurses are rare. The purpose of this study was to assess the effects of general health and oral hygiene on the health of the gingival tissues, utilizing the expertise and viewpoints of a nurse and a dental hygienist. The research hypotheses were that bleeding point scores would be significantly higher for subjects with high plaque scores, and that bleeding point scores would be significantly higher for subjects with a positive medical history.

METHODS

A convenience sample of 37 adult clients in a private dental practice was used. To be included, subjects had to be over 18, have at least 22 natural teeth, and be willing to participate in the study. There were 18 females and 19 males. After signing the consent form, subjects completed a medical history questionnaire. This questionnaire listed medical conditions and medications which would effect bleeding or healing.

Bleeding point scores were measured with a Hu-Friedy Williams periodontal probe using the Papillary Bleeding Index (PBI) of Muhlemann.[20] The scoring criteria for the PBI are as follows:

0	No bleeding.
1	Isolated dots of blood and/or a thin line of bleeding less than 1/2 of area probed.
2	A thin line of bleeding more than 1/2 of probed area or a discrete speck of blood interdentally.
3	Interdental triangle filled with blood.
4	Profuse bleeding immediately on probing.

Bleeding point scores were recorded for six areas on each tooth; the mesio-facial, facial, disto-facial, disto-lingual, lingual and mesio-lingual.

Plaque was measured with the periodontal probe using Sillness and Loe's Plaque Thickness Index.[21] Scoring criteria for this index are:

0	No gingival area plaque.
1	A thin film of plaque visible on the tip of a probe after it has been moved across the tooth.
2	Moderate accumulation of plaque seen without disclosing solution.
3	Abundant plaque.

Plaque was measured for the same six areas on each tooth surface as bleeding points. The total plaque score was divided by the number of teeth to give the average plaque score. Both plaque and bleeding point scores were measured and recorded by a dental hygienist who had been trained in the use of the indices and calibrated for probing pressure of ten grams.

RESULTS

The medical history questionnaires were reviewed and classified as positive or negative. The medical history was considered positive if one or more positive responses were given on conditions or medications which would effect bleeding or healing. Thirteen subjects had at least one positive response on the medical history. The most common positive responses were diabetes, daily aspirin intake, and use of oral contraceptives. Effect of total plaque score and medical history on total bleeding point scores was analyzed using a 2x2 ANOVA. Multiple regression was used to analyze the effects of plaque and medical history response for facial and lingual tooth surfaces.

Average plaque scores ranged from 1.00 to 7.60. The mean was 3.02 with a standard deviation of 1.50 and the median was 2.81. Total bleeding point scores ranged from 1 to 208 with a mean of 37.78, standard deviation of 42.4 and median of 26.5. Bleeding point scores per facial or lingual surface ranged from 0 to 12, with a mean of 2.50, standard deviation of 2.17 and median of 2.0.

The analysis of variance showed that the effect of plaque was significant (F-4.39, df-1,33, p<.05). Subjects with plaque scores above the median had significantly higher PBI scores, regardless of responses on the medical history, than subjects with plaque scores below the median. Bleeding point scores for subjects with low plaque scores ranged from 1 to 65. The range of PBI scores for subjects with high plaque scores was 5 to 208, and averaged 49.9 (s.d.-5.83) compared with an average bleeding point score of 24.12 (s.d.-19.11) for those with low plaque scores.

The effect of positive responses on the medical history approached statistical significance (F-3.98, df-1,33, p<.075). Subjects who had one or more positive responses on the medical history, regardless of the amount of plaque, had more bleeding points than those with no positive responses on the medical history had bleeding point scores which ranged from 1 to 93 with a mean of 28.04 (s.d.-23.66). The interaction between plaque and medical history was not significant.

Multiple regression was used to analyze scores on 562 facial and lingual tooth surfaces. The correlation between bleeding point score and plaque score was .33. When medical history was added, the multiple correlation increased to .485. Both of these correlations are significant at the .001 level. R^2, the coefficient of determination, between bleeding point score and plaque was .11. When both plaque and medical history were included in the correlation, the coefficient of determination was .24. Plaque by itself accounted for eleven percent of the variance in bleeding point scores. Medical history by itself accounted for nine percent of the variance. Plaque and medical history together accounted for almost one-fourth of the variance in bleeding point scores.

DISCUSSION

The first research hypothesis, that bleeding point scores would be significantly higher for subjects with high plaque scores, could be accepted at the .05 level of significance. The second research hypothesis, that bleeding point scores would be significantly higher for subjects with a positive medical history, could not be accepted at the .05 level, although the results approached statistical significance. Therefore, use of bleeding point scores as determinants of oral health may be limited by the individual's medical history.

The sample in this study was limited, and the results should be interpreted with caution. Subjects were clients in a private dental practice. Although subjects did not know plaque and bleeding points would be measured, they were prepared for a dental appointment. Therefore, the plaque found in this study probably underestimated the amount of plaque normally present.

Analysis of plaque and PBI scores on facial and lingual surfaces was done to examine the effects of the variables at specific sites. Plaque has been shown to differ in bacterial composition from one site to another in the same mouth[5]. The differences in microbial compositon have varying effects on tissue, which might not be apparent when total scores or averages are analyzed. Because of the number of surfaces examined, the correlations themselves should be considered rather than statistical significance alone. Although statistically significant, the correlations were low to moderate. The coefficient of determination, r^2, is "the proportion of variance in the dependent variable that is predictable from the independent variable."[22] Plaque and medical history each accounted for about ten percent of the variance in bleeding points. Both variables together increased the percent of predictable variance to almost one-fourth.

Determination of positive medical history was based solely on client self-report. The validity of self reports has been questioned. Surveys have shown that from 30 to 80 percent of medical histories where clients had reported being in good health were not accurate.[23-25] Reasons suggested for the lack of accuracy include an unwillingness to divulge information and lack of knowledge. Possibly some of the subjects in this study who gave no positive responses on the medical history questionnaire did in fact have a medical problem. This may explain why the effect of medical history was not significant.

Bleeding point scores are a valid, objective assessment of gingival health. Possible uses for this index include evaluation of the effectiveness of oral hygiene care administered by nurses to the sick, daily oral self-care, and dental health education programs, whether provided by nurses or dental hygienists. The collaboration of nurses with dental hygienists can enhance oral and general health for a wider variety of client populations than either could reach alone.

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THE VESTIBULAR AND VISUAL SYSTEM BASES OF LEARNING DISABILITY:

A PILOT STUDY

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ABSTRACT

The educational and medical communities have long sought causes of learning disabilities. One branch of medicine/allied health has attempted to examine the vestibular system (the system that detects gravity and gives us balance) as an area that when dysfunctional might contribute to learning disabilities. It is felt that visual systems related to the vestibular system might also play a role. Allied health practitioners use a clinical test to assess vestibular dysfunction in these systems in normal and learning-disabled (LD) children in a laboratory setting with objective, computer-controlled measurements and to compare this data to clinical data.

A pilot study was designed to describe the parameters of the visual and vestibular systems in 4 LD children and 4 non-LD children matched in age, sex, and IQ. Results indicated no significant difference between the LD and non-LD children on the test when the vestibular system is acting alone. Some interesting differences were found to distinquish the two groups during a test involving interaction of a visual system and the vestibular system. Also no correlation was found between the clinical test used by therapists and a similar laboratory test. This finding questions previous research.

This study necessitated collaboration between the bioengineer and the occupational therapist. The bioengineer with knowledge in computer operations and electronics is an essential collaborator with the allied health professional to gather more precise laboratory data to identify the neurophysiological substrates of learning disabilities.

STATEMENT OF THE PROBLEM AND RELATED WORK

The problems that underlie learning disabilities in children have been investigated vigorously for the past few decades with little success. One avenue of investigation has been examination of deviations in the human nervous system as the problable cause of learning problems. More specifically, some researchers (Ayres, 1972b; deQuiros, 1976; Frank and Levinson, 1976) have sought to establish a link beween the vestibular system (the system in the inner ear related to balance and detection of movement) and learning disability. In the late 1960's, A. Jean Ayres (1972b), an occupational therapist and educational psychologist, studied the relationship of the vestibular system to learning. In 1975, she published a clinical evaluation called the Southern California Postrotary Nystagmus Test (SCPNT). This test along with other standardized (Ayres, 1980) and nonstandardized tests were to assess problems in sensory integration that involved dysfunction of the vestibular system. The SCPNT soon became widely adopted as the major behavioral measure of vestibular function. The SCPNT is a clinical tool that measures the duration of nystagmus (a rapid, back and forth movement of the eyes) after rotating the individual about a vertical axis on a small spinning board. These eye movements are called postrotary nystagmus (PRN) and consist of a fast movement, the fast phase, and a slow movement, the slow phase. The amount of excursion of the eyes during this reflex movement is also assessed. Ayres (1975) hypothesized that a short duration of nystagmus as measured by this test (5 seconds or less) or too long a duration of nystagmus is abnormal. She found that about 50% of learning disabled children had a shortened duration of nystagmus (Ayres, 1978). For approximately the past fifteen years, occupational therapy for this subgroup of children has been based on this hypothesized vestibular system dysfunction. Ayres' development of the SCPNT and her interpretation of findings using this evaluation (along with other tests) has been an important first step in establishing a theory of sensory system disorder upon which to base practice. Limited research (Ayres 1972a, 1978) has shown treatment based on this assessment and others to be effective for some types of learning disabled children.

Recent research has questioned Ayres' theory that the SCPNT measures vestibular function alone. Polatajko (1985) has shown that there is no difference in the vestibular systems of learning disabled and non-learning disabled children as evidenced by laboratory tests. Instead, Polatajko has urged the investigation of visual systems that interact with the vestibular sysem. Polatajko (1983) also found no correlation between the SCPNT and laboratory testing of vestibular system using electronystagmography (ENG), the electronic recording of eye movements. In studies involving very small samples of learning disabled children, Keating (1979) found that the SCPNT administered using ENG did not correlate with results using the regular method of measuring nystagmus duration. In the regular method, the therapist observes the nystagmus and measures the duration of nystagmus using a stopwatch while in the ENG method the observation and recording are done electronically.

Barber and Stockwell (1980) have described three visual systems that interact with the vestibular system. The optokinetic system detects movement of the surrounding visual field and complements the vestibular system which detects movement of the head. This system is thought to be activated during the SCPNT. The pursuit system allows for tracking of moving targets. A small moving stimulus in the visual field stimulates the pursuit system to try to keep the rate of slippage of the target on the retina to a minimum. The saccadic system allows quick eye movements (saccades) to be made in response to a visual target appearing in the periphery of the visual field. The eyes move rapidly to place the target on the center part of the eye called the fovea. Most voluntary shifts of gaze are saccades. An example relevant to learning is the eye movements performed when reading. A type of saccade defect called dysmetria may be present in learning disabled children. The signal from the visual periphery may be incorrect, so that the saccade does not place the target accurately on the fovea. Trial and error using additional saccades are then necessary to acquire the target.

Recent electronystagmorgraphic studies of dyslexic children have produced inconsistent results in explaining sensory systems related to learning disability. Using a group of ENG tests, Frank and Levinson (1973) found ENG abnormalities in 26 of 30 dyslexic children. They interpreted these abnormalities as an indication of cerebellar-vestibular dysfunction. Stockwell, Sherard, and Schuler (1976) however, reported no clinically significant evidence of vestibular dysfunction in dyslexic children. Results of this study suggested defective eye movement control in dyslexic children with additional neurological abnormalities. Dyslexic children without other neurological problems did not show any abnormalities. Although, as Stockwell et al. (1976) pointed out, dyslexia probably encompasses a number of neurologic disorders, dyslexia is a problem which may interfere with learning. A study by Ottenbacher, Watson, Short, and Biderman (1979) indicated that learning disabled children with decreased PRN performed more poorly on saccadic fixation tests than those without decreased PRN. These results suggest that the visual systems may influence PRN.

Davidson, Stockwell and Barin (1984) employed a method that could assess the contribution of visual and vestibular systems during PRN. They rotated subjects in total darkness where PRN is solely due to the vestibular system. In another condition, they investigated the interaction of the vestibualr, optokinetic, and pursuit systems using a method of combining dark and light conditions. Rotation occurs in total darkness; about 3 seconds after PRN begins, a light comes on for 4 seconds. During the time the light is on, the subject is asked to fixate on a stationary target. When the light turns off, PRN returns and is measured for approximately 30 seconds. Another condition related to the optokinetic system that was not employed in the above study is rotating the subject in dim light. This condition occurs in the clinical test, the SCPNT. This pilot study will test subjects in all these conditions using electronic eye movement recording (EOG) to assess the contribution of the visual and vestibular system.

In summary, the major problems that the study addressed were, first, the lack of a consistent identification of sensory system features that distinguishes learning disabled from non-learning disabled children. Secondly, the validity of the SCPNT as a measurement of vestibular system functioning alone has been questioned, and more data is needed to substantiate recent research.

COLLABORATIVE NATURE OF THE STUDY

Collaboration between an occupational therapist with a background in sensory system function/dysfunction and a bioengineer familiar with laboratory vestibular testing was needed to investigate in depth the role of vestibular and related visual systems in learning disability. The operation of the equipment used in electrooculography (EOG), the interpretation of the EOG data, and computer programming for data analysis, were not within the capabilities of the occupational therapist. These skills and other electronic and mechanical abilities were possessed by the bioengineer who also had a background in vestibular anatomy, physiology and assessment. Collaboration with an occupational therapist who possessed a background in clinical assessment and treatment of the vestibular system (and other sensory systems) produced a comprehensive research team.

In problems similar to the one studied here, occupational therapists can bring assessment and practice problems to the laboratory for cooperative investigation with the bioengineer. Occupational therapists may be treating patients in a setting from which subjects could be selected. Occupational therapists' knowledge of school systems from which patients may be selected can be invaluable. Bioengineers can contribute to collaborative research with occupational therapists by providing state-of-the-art measurement technology which may not be readily accessible to therapists. In addition, bioengineers can apply their knowledge of control theories to systematic experiment design and quantitative data analysis.

OBJECTIVES

The objectives of the study were:

1. to describe the parameters of the PRN related to the vestibular and visual systems in learning disabled children,

2. to replicate the findings of Polatajko (1983) that the vestibular system alone does not distinguish the two groups and that the clinical test, the SCPNT, does not correlate with vestibular testing results in the laboratory using EOG,

3. to identify if a laboratory test of the optokinetic/vestibular system correlates with the clinical optokinetic/vestibualr test - the SCPNT.

METHOD

A small pilot study was done with four learning disabled children and four non-learning disabled children who were matched in age, sex, and I.Q. The school occupational therapist selected the subjects, gave an oral briefing to the parents, obtained parental consent, and referred the children for testing on the SCPNT. The group membership was not known to the investigators. All children were screened for medical factors, drugs, otological and neurological problems that might influence PRN.

All children, selected from the same school district, were tested on the SCPNT in the same room. The children sat for 5 minutes before having the test administered as they also did for the laboratory testing.

In the laboratory test of PRN, an apparatus consisting of a rotary chair (Contraves Corporation) housed in a cylindrical light-proof booth approximately 6 feet in diameter, was used. The chair rotated about a vertical axis from 0 to 100 deg/sec velocity in about 2 seconds. The walls of the booth were concentric to the rotary axis of the chair. A red light in the ceiling of the booth was turned on during rotation as needed. A PDP 11/34 minicomputer controlled the chair rotation and the timing of the light.

Before the test, the testing apparatus was shown to the mother and child. After the mother left the testing area, the child was instructed to sit in the chair. One of the investigators was seated on the back of the chair to give the child instructions and hold the child's head at a 30 degree angle so that the horizontal semicircular canal of the vestibular receptor would be similarly stimulated in each child. The booth was then sealed closed. The co-investigator was outside the booth operating the computer.

Horizontal eye movements were recorded by two electrodes placed at the outer canthus of each eye. Eye voltage signals were amplified and recorded on a nystagmograph (a graphic record of PRN) for later analysis.

Each subject received two rotations, one to the left and one to the right. The subjects were rotated for 60 seconds and eye movements were recorded for 30 seconds following rotation. Math tasks were given intermittently to the child during testing to maintain an alert state. No less than 5 minutes separated each of the trials. The left-right rotations were performed under three different light conditions.

Condition 1 - a totally darkened booth (vestibular system tested alone).

Condition 2 - a totally darkened booth with a combination of dark-light-dark. The PRN phase following deceleration consisted of 3 seconds of darkness followed by 4 seconds of light to enable the child to fixate on a visual target on the wall of the booth. The light was then turned off, and remained off for the rest of the test.

Condition 3 - a dimly lit booth. This condition was similar to conditions in which the clinical test, the SCPNT, is given.

RESULTS AND CONCLUSIONS

The selected parameters related to Objective 1 are: maximum velocity of slow phase nystagmus and duration in total darkness condition (vestibular system only), maximum velocity of the slow phase and duration in dim light condition (optokinetic system), maximum velocity of the slow phase before and after fixation on a target (pursuit system), frequency while the light is on during pursuit test, ability to pursue, and duration of PRN on the SCPNT (measured in seconds). Duration in the laboratory tests was defined as the point when the slow phase velocity dropped below 10 deg/sec.

Related to Objective 1 to describe the parameters of PRN in the two subject groups and related to Objective 2 to determine if the vestibular system acting alone distinguished the two groups, a non-parametric statistic test of differences in means, the Wilcoxon two-sample test was employed. No significant differences in the maximum velocity of PRN (the slope of the slow phase of PRN) was found between the two groups in the totally darkened condition. This finding supports the findings of past research (Polatajko 1983, 1985) that the vestibular system alone does not distinguish the two groups. There were no significant differences in duration in the darkened condition although the scores of rotation to the left (p=.11) and right (p=.18) approached significance.

One finding of interest was the velocity of the slow phase of PRN after 4 seconds of light or the rebound of PRN after fixation. The results after rotation to the left (p=.19, Wilcoxon) and to the right (p=.24, Wilcoxon) approached significance. The data below display means and percentage differences of maximum rebound velocities of group members after rotations to the left and right.

	Non-LD	LD	% Difference
Rotation left	37deg	24deg	35%
Rotation right	45deg	29deg	36%

The investigators feel that this finding indicates the necessity to replicate this test with a larger sample. In a larger sample, this parameter may distinguish the two groups. A possible interpretation could be oversuppression of the vestibular system by the pursuit system. Further investigation might decipher whether an abnormal interaction between the vestibular and visual systems might exist. No other parameters in this condition where the pursuit system was activated, including frequency and ability to pursue, were found to distinguish the two groups.

An analysis of the regularity of PRN in all trials was performed. Criteria for regularity included uniformity and consistency of frequency and amplitude of nystagmus beats as viewed in the nystagmographs. The Wilcoxon two-sample test approached significance (p=.06); the non-learning disabled displayed regular PRN 50% more often than the learning disabled. Further study is needed to define this variable in more objective and measurable terms.

Related to Objective 3 to identify if a laboratory test of the optokinetic system correlates with the clinical test of this system, the SCPNT, there was no significant correlation found in duration scores (total scores and right rotation scores) between the clinical and laboratory tests in the dim light condition (the red light on during rotation and PRN), except for learning disabled children for left rotations. The Kendall Tau coefficient was 1.0 (p=.04) for this rotation. The correlation for rotation to the left and total rotation scores (left plus right) approached significance for this group.

The lack of correlation between the clinical and laboratory tests may be due to one or more of the following:

1. small sample size
2. testing differences such as speed of rotation (180 deg/sec for the clinical test vs. 100 deg/sec for the laboratory test) and method of scoring (by eye vs. EOG)
3. tests may measure two different aspects of vestibular/visual interaction

Further investigations with larger sample sizes are needed. Also, protocols must be designed to minimize some of the testing differences. Many parameters related to the setting and equipment in connection with individual variables such as alertness or fear need to be carefully controlled and studied before conclusions regarding test validity can be drawn.

SUMMARY AND FUTURE CONSIDERATION

A collaborative study was performed by an occupational therapist and a bioengineer who had knowledge and interest in both the vestibular system and visual systems. By combining their knowledge and skills, a pilot study investigating some important parameters related to recent research in the causes of learning disability was undertaken. The study confirmed that the vestibular system alone does not differentiate learning disabled from non-learning disabled, and that parameters of vestibular/visual interaction need further study. Perhaps a test of pursuit in combination with vestibular function (a test of fixation suppression) may be more sensitive in distinguishing learning disabled from non-learning disabled.

Further collaborative efforts between the occupational therapist and bioengineer are needed to answer the questions that this pilot study raised. Are there subgroups of learning disabled children who have varying kinds of vestibular/visual system interaction problems? Does the optokinetic system play a major role in learning disability? Can clinicals test be devised to objectively assess functioning of the visual systems that interact with the vestibular system? Occupational therapists need to keep abreast of the research findings in these areas to relate outcomes to clinical practice. Bioengineers need to seek clinical application and research for laboratory apparatus when outcomes indicate. It is hoped that this interdisciplinary collaboration will offer hope to some learning disabled in the near future.

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EFFECT OF LOCAL HYDROCORTISONE PHONOPHORESIS ON SERUM GLUCOSE AND CORISOL LEVELS IN MICE

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ABSTRACT

Hydrocortisone, a steroid hormone, when administered orally or by injection, will cause increased blood glucose levels. It may also be administered topically and be driven into the tissue by ultrasound, a procedure known as hydrocortisone phonophoresis. This treatment modality, commonly used in physical therapy, has been reported to be effective for selected inflammatory conditions such as bursitis. It is unclear if hydrocortisone phonophoresis introduces an amount of hydrocortisone sufficient to produce an elevation of the blood glucose level. This study (in progress) involving the Departments of Physical Therapy and Clinical Laboratory Sciences of Temple University, is investigating this relationship in an animal model.

Forty mice were randomly assigned to one of four groups: a control (no treatment), a group receiving ultrasound treatment, one receiving topical hydrocortisone, and one receiving hydrocortisone phonophoresis. Blood samples taken prior to treatment and at 2, 4 and 6 hours after treatment were analyzed for glucose and cortisol. The data were analyzed with a two way analysis of variance with one repeated measure to detect any significant difference in the four treatment groups. Final results will be shared at the symposium.

It is anticipated that this interdisciplinary collaboration will indicate for the first time in an animal model whether or not this commonly used physical therapy modality carries an inherent risk, particularly for diabetics.

INTRODUCTION

This research was based on the following question: Will topically applied hydrocortisone, which is forced into tissue by ultrasound, cause an elevation in the blood hydrocortisone level to produce an elevation of blood glucose? This question is clinically pertinent for a number of reasons.

Hydrocortisone phonophoresis is a common treatment modality in physical therapy. It has been reported to be effective in selected inflammatory conditions such as bursitis, epicondylitis and tendinitis[1]. Phonophoretic effectiveness is thought to result from the ability of high energy sound to deliver the hydrocortisone subcutaneously into skeletal muscle and peripheral nerve. Michlovitz and Ziskin[2] suggest two mechanisms for driving the drug into tissue: heating by ultrasound causes a change in tissue permeability; and radiation pressure/acoustic streaming force the drug into the body along the ultrasound beam.

Hydrocortisone (cortisol) is a steroid hormone which is produced in vivo and which has a profound effect on carbohydrate, lipid and amino acid metabolism, with a net effect of increasing blood glucose levels. This effect will be particularly noted in the fasting state and during stress[3]. Increased glucose production has been shown to occur as early as two to six hours after the elevation of blood cortisol[4]. Since a patient who is referred to a physical therapist for hydrocortisone phonophoresis may also be taking drugs such as insulin to regulate blood glucose, it is important to determine whether the administered cortisol is sufficient to counteract the insulin effect. While studies have been done to test the effect of ultrasound on the capillaries of hamster cheek pouches[5] and on temperature and blood flow rate in human skeletal muscle[6], this is the first study of the effect of hydrocortisone phonophoresis on blood levels of glucose and cortisol in an animal model. This study is a collaborative effort of the Departments of Clinical Laboratory Sciences and Physical Therapy at Temple University, and was funded by a Temple University Grant-in-Aid of Research.

SUBJECTS

Forty male Sprague-Dawley rats, weighing from 190 to 219 grams, were used in this study. They were fasted a minimum of nineteen hours prior to the start of the experiment. Each rat was anesthetized prior to the start of the experiment with an intraperitoneal injection of 0.1 ml of a 35% (w/v) solution of chloral hydrate per 100 grams of body weight.

MATERIALS AND METHODS

Depending upon treatment group, one of two ultrasound couplers was used: either plain Aquasonic gel (Parker Laboratories, Inc. Orange, NJ 07050) or 10% (w/v) hydrocortisone phosphate in Aquasonic gel. All ultrasound treatments (sham or real) were performed with a Mettler Electronics Sonicator Model 706 with an effective radiating area of 9.6 cm^2. The instrument was calibrated to deliver $0.80 + 0.03$ w/cm^2. Each treatment lasted five minutes, occurred over a shaved area of the right hindquarter, and used a moving sound head technique.

Blood samples were collected prior to treatment and at three (3) hours post-treatment. All animals were warmed under an infrared lamp for at least five minutes prior to blood collection. A section of the tip of the tail was removed with scissors, and the blood was collected in a Carroway capillary tube. Blood samples were not anticoagulated, and ranged from

200-345 microliters in volume. The samples were allowed to clot and were centrifuged within an hour at 3000 rpm for five minutes. The serum was removed and, if necessary, recentrifuged to remove any erythrocytes. All samples were frozen until analyzed for cortisol, then re-frozen until analyzed for glucose.

The forty rats were divided into four treatment groups. The control group received sham ultrasound with 1.5 ml of plain gel applied to the transducer as the coupling agent. The second group received sham ultrasound with 1.5 ml of hydrocortisone phosphate gel as coupler. The third group had ultrasound treatment (continuous wave, 0.80 w/cm^2) using 1.5 ml of plain gel as coupler. The fourth group experienced ultrasound treatment (continuous wave, 0.80 w/cm^2) with 1.5 ml of hydrocortisone phosphate gel as coupler. It was originally intended that the ultrasound treatment would be at 1.5 w/cm^2, (a setting commonly used in human phonophoresis treatments) and the first animal in the ultrasound group did, in fact, receive this treatment. It was evident (from the animal's discomfort, even under anesthesia) that the intensity was too large. Subsequent welling of the hindquarter area of this animal necessitated discarding the animal and lowering the ultrasound intensity for the remainder of the study to 0.80 w/cm^2. All animals were awake and mobile at the time of the three-hour bleeding, and were gently restrained in a small plastic cage for the short time needed to obtain the second blood sample.

Cortisol was analyzed by radioimmunoassay (Corning ImmoPhase, Medfield MA) with final calculation of samples made through extrapolation from a standard curve run concurrently. Glucose was analyzed colorimetrically by means of a glucose oxidase/peroxidase (modified Trinder) method (Stanbio Laboratory Inc., San Antonio TX). The spectrophotometer used (Bausch and Lomb Spectronic 100) was set at 100 mg/dL with a standard run concurrently with the samples, and final results were read directly from the instrument. Serum controls were run with both procedures to monitor the quality of each set of analyses. All controls were within the acceptable ranges for each assay performed. The data were analyzed with a one-way analysis of variance to detect any significant difference in the four treatment groups.

RESULTS

Table 1 presents the data from the analysis of variance (ANOVA) with pre-treatment blood cortisol levels as the dependent variable. Tables 2 to 4 present the ANOVA with post-treatment cortisol, pre-treament glucose and post-treatment glucose, respectively, as the dependent variable. Table 5 show those analyses which did or did not exhibit a significant difference.

Table 1. Analysis of variance (group vs. pre-treatment blood

cortisol level)

Source of variation	DF	F	Significance level
Between groups	3	6.326	0.003
Within groups	26		
Total	29		

Group Statistics

Group	N	Mean	SD
Control	7	3.143	2.337
Ultrasound only	9	7.956	5.701
Hydrocortisone only	6	13.950	6.799
Phonophoresis	8	14.013	6.303

t-Test

Control vs. Hydrocortisone only	$t = 3.498$ $p = 0.026$
Control vs. Phonophoresis	$t = 3.782$ $p = 0.020$

Table 2. Analysis of variance (group vs. post-treatment blood cortisol level)

Source of variation	DF	F	Significance level
Between groups	3	14.462	0.000
Within groups	16		
Total	19		

Group Statistics

Group	N	Mean	SD
Control	6	12.833	9.477
Ultrasound only	4	37.375	12.566
Hydrocortisone only	8	13.100	8.593
Phonophoresis	2	56.500	13.435

Table 2. (Continued)

t-Test

Control vs. Ultrasound only t - 3.778
p - 0.020
Control vs. Phonophoresis t - 5.315
p - 0.007
Ultrasound only vs. Cortisol only t - 3.939
p - 0.018
Cortisol only vs. Phonophoresis t - 5.456
p - 0.007

Table 3. Analysis of variance (group vs. pre-treatment blood glucose level)

Source of variation	DF	F	Significance level
Between groups	3	9.272	0.001
Within groups	15		
Total	18		

Group Statistics

Group	N	Mean	SD
Control	6	71.667	11.075
Ultrasound only	5	84.800	9.257
Hydrocortisone only	4	94.750	13.961
Phonophoresis	4	107.250	9.032

t-Test

Control vs. Cortisol only t - 3.278
p - 0.031
Control vs. Phonophoresis t - 5.052
p - 0.009
Ultrasound only vs. Phonophoresis t - 3.067
p - 0.038

Table 4. Analysis of variance (group vs. post-treatment blood glucose level)

Source of variation	DF	F	Significance level
Between groups	3	12.100	0.000
Within groups	16		
Total	19		

Group Statistics

Group	N	Mean	SD
Control	6	78.000	9.209
Ultrasound only	4	112.250	6.397
Hydrocortisone only	6	100.500	5.320
Phonophoresis	4	94.500	15.067

t-Test

Control vs. Ultrasound only	$t = 5.736$ $p = 0.006$
Control vs. Cortisol only	$t = 4.213$ $p = 0.015$

Table 5. Summary of Groups' Significant Differences. Any marked with "x" had $p < 0.050$

Groups	Glucose		Cortisol	
	pre	post	pre	post
control vs. ultrasound only		x		x
control vs. cortisol only	x	x	x	
control vs. phonophoresis	x		x	x

Table 5. (Continued)

Groups	Glucose		Cortisol	
	pre	post	pre	post
control vs. ultrasound only		x		x
control vs. cortisol only	x	x	x	
control vs. phonophoresis	x		x	x
ultrasound only vs. cortisol only				x
ultrasound only vs. phonphoresis	x			
cortisol only vs. phonophoresis				x

DISCUSSION

The analysis of variance suggests that a significant difference existed between the control group and the hydrocortisone group, and between the control group and the animals that received hydrocortisone phonophoresis. This difference existed for both cortisol and glucose levels, before treatment was applied to any animal. In light of this, there can be no statement made relative to a significant difference that occurred after treatment. There is also no discernable pattern between the pre-treatment versus post-treatment results. When examining the raw data from this experiment, a wide range of values within groups and between groups becomes apparent, even in the pre-treatment values for both cortisol and glucose. An attempt to remove obvious outliers from each set of data resulted in the elimination of almost half of the cases, thereby significantly decreasing the sample size. The following set of variables may have contributed to these results.

With the initial processing time required for each animal (approximately ten minutes), two investigators, one ultrasound unit, and 40 animals, it is obvious that some of the rats experienced a much longer time of fasting prior to the pre-treatment blood sampling (which was done immediately before the treatment was performed). This pre-treatment fasting time (Table 6) average 20.05 hours for the control group, 25.46 hours for the ultrasound group, 26.51 hours for the hydrocortisone group and 24.1 hours for the phonophoresis group. Post-treatment fasting averages were 23.05, 28.46, 29.51 and 27.05 hours respectively. Since cortisol levels will increase in the fasting state[7], the variation in fasting time itself may have contributed to the variation in both cortisol and blood glucose levels, regardless of treatment.

Table 6. Fasting Times for Pre-treatment and Post-treatment Blood Samplings (in hours)

Group	Pre-treatment	Post-treatment
Control	20.05	23.05
Ultrasound only	25.46	28.46
Hydrocortisone only	26.51	29.51
Phonophoresis	24.1	27.05

While warming the animals under an infrared lamp was a very effective way of providing an adequate blood collection from the tail, it was not uniformly so. Some animals, upon having their tails snipped, still did not bleed freely, and required some milking to provide the minimal sample required. In humans, such milking (after a fingerstick capillary puncture, for example) may introduce a significant amount of tissue fluid to a sample, rendering it inappropriate for analysis[8]. This may also be the case for rat tail samples.

Sample hemolysis, according to the assay manufacturers, should not have been an analytical factor in either analysis used. However, since many of the samples were hemolyzed, hemoglobin interference could not be ruled out.

Finally, the small quantity of serum collected (60-150 microliters), while more than adequate for both procedures (even in duplicate), was, for some samples, too small to prevent the effects of evaporation. Despite capping of tubes and freezing of the samples when not being analyzed, some samples were rendered "gns" (quantity not sufficient) by the end of the experiment. This, perhaps, is the best explanation for the very high values for both cortisol and glucose seen in the raw data. Again, however, it must be noted that a pattern was not present; that is, if a sample's cortisol was elevated, it did not always follow that the glucose was elevated.

CONCLUSION

This study had been an investigation into the relationship between hydrocortisone hponophoresis and blood glucose and cortisol levels in an animal model. It must be considered to be a preliminary study since a number of variables have been indicated to have a potential impact on the final results. Further investigation of this question in both animal models and human subjects will be needed to control for these variables (hemolysis, fasting time, evaporation).

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PART IV

RESEARCH RELATED TO MANAGEMENT AND PROFESSIONAL PRACTICE

The fourth part of the Symposium included papers related to management and professional practice:

Attitudes Toward and Knowledge of the Older Adult: A Survey of Prospective Health Care Professionals

Needs Assessment of Medical-Surgical Clinic Patients to Determine Effective Methodology in the Presentation of Nutrition and Health Education Concepts

Health Occupations Clinical Teacher Education Series for Secondary and Post Secondary Educators

Planning for the Future: An Interdisciplinary Approach Within a Division of Allied Health

ATTITUDES TOWARD AND KNOWLEDGE OF THE OLDER ADULT:

A SURVEY OF PROSPECTIVE HEALTH CARE PROFESSIONALS

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ABSTRACT

The purpose of this study was to determine the knowledge and attitude of prospective occupational therapy and physical therapy students toward older adults (age 65 and older); and their preference for future interaction with the older adult. A survey was conducted of 211 prospective applicants to the occupational therapy and physical therapy programs at Indiana University. Descriptive and inferential statistics were performed. Overall the responses tended to show a positive attitude towards, and an accurate knowledge base of, the elderly population. However, full-time work settings with the elderly were not the preference of the prospective health care professionals. One significant implication from this study is that an experience of a lengthy and in-depth nature with older adults seems to enhance the desire to work with this population.

INTRODUCTION

Due to the increasing numbers of adults 65 years of age and over, there is and will continue to be a demand for practitioners to care for the elderly. It becomes critical, then, that health professional curricula adequately prepare future practitioners to meet this demand. Professional preparation must provide not only the appropriate knowledge and skills enabling one to practice as a responsible clinician; but also, it must be able to foster a positive attitude and, in turn, the desire to work with this growing population. Currently there is little literature describing attitudes and knowledge of allied health students toward the elderly. Therefore, it seemed appropriate that this problem be investigated. The purpose of this research project was to determine the attitude and knowledge of prospective health professional students, specifically occupational and physical therapy program applicants, toward older adults. In addition, the study queried students' preference to have future interaction with the older adult.

LITERATURE REVIEW

It has long been recognized that the American society has placed a stigma upon older citizens, so that everyone has been infected to a degree with ageism (Adelman). "Ageism" - a term given to the prejudices and stereotypes that are applied to older people purely on the basis of their age (Butler, p. 175) - has become a pervasive factor in our society. Health care providers have not been immune to this influence. It has caused some practioners to minimize or deny needs for care to older clients. These ageist attitudes exhibited by health professionals arise from their own fears of mortality, dysfunction, and consequences of aging, as well as confusion between that which constitutes pathological from normal aging. And, of course, the "Pepsi generation" of youth promoted by the media has fueled these negative attitudes (Adelman).

In reviewing the literature, it is evident that this ageist attitude has pervaded the medical, nursing, and social service professions for many years (Belgrove, et al; Benson; Wilhite, et al; Adelman; Butler). The last ten to fifteen years, however, have shown a dramatic turn-around by these health providers to investigate the "why" of the situation and to seek solutions to overcome the negative effect. Researchers agree that education in gerontology and direct person-to-person contact with older adults are the best learning experiences to counteract negative attitudes.

> "A large proportion of these (medical students' future practices will be with the elderly as an inevitable result of existing demographic trends. Failure to have a realistic understanding of the characteristics of older patients can have a negative effect both on their treatment and on the quality of doctor-patient relationships.... Gerontological training, in short, is needed in the interests of providing the highest quality of health care services to his major segment of the population." (Belgrove, etc., p. 43)

> "A significant part of providing prepared personnel to work with the gerontological training, in short, is needed in the interests of providing the highest quality of health care services to this major segment of the population." (Belgrove, etc., p. 43)

> "A significant part of providing prepared personnel to work with the gerontological population is education." (Stratton, etc., p. 151)

> "...in order to create more positive attitudes, we must begin by providing better learning experiences in basic nursing education programs that should focus on wellness and the elderly person." (Benson, p. 281).

It is very likely, then, that pre-professional students will enter allied health programs with attitudes comparable to those of society as a whole and the health service professions specifically. Such stereotyping is likely to affect both patient care and training of future clinicians. Therefore, an understanding of the factors associated with ageist viewpoints is important, not only in assuring adequate treatment of the elderly, but also in planning curricula to prepare future practitioners to assist in increasing the quality of life for this age group.

The authors' perceived need for this study was confirmed when it became evident during the literature review that scant research had been conducted concerning attitudes of allied health students toward the elderly. Another outcome of the literature review was the identification of a research tool for this study, the "Attitudes Toward Old People Questionnaire" (AOP) by Tuckman & Lorge, 1953. The AOP consisted of 137 statements about old people classified into 13 categories. It was first administered to 147 graduate students enrolled in a course, "Psychology of the Adult," at Teachers College, Columbia University (Tuckman, etc., 1953, p. 250). The findings showed that even a sophisticated group of graduate students agree substantially with ageist beliefs and generalizations about old people..., indicating that old age is looked upon as a period of economic insecurity, poor health, loneliness and failing physical and mental powers (Tuckman, etc., 1952, P. 400). The Tuckman study indicated the need for additional objective data to prove or disprove the prejudices and misconceptions about the abilities, physical and personality characteristics of old people. For this particular study, the AOP was to be part of this survey. Further explanation of the tool for this study is given in the Methods section.

Stereotypical attitudes exist and probably influence behavior of health professionals who deal with the elderly. Additional current data is needed to assess the allied health student's perception of "growing old" and its influence on professional behavior and choice of clinical specialty area.

METHODS

Questionnaire

A survey, consisting of 70 questions, was developed for use with computer scoring sheets. The survey was divided into 4 sections. In the first section, demographic information was collected regarding the participant's sex, age and professional interest (either physical therapy or occupational therapy). The second section obtained information regarding type, frequency and duration of past and present volunteer and work experiences. Also, questions were posed regarding the participant's preferred choice of time involvement with the older adult in a potential future clinical rotation and in a potential future work setting. The third section of the survey consisted of 20 true-false questions identifying the participant's knowledge of the older adult. These questions were taken from various published sources. The final section of the survey consisted of 39 statements representing each of the 13 categories from Tuckman's original survey. These true-false items included attitudinal groupings around the following topic headings:

TOPIC	# OF QUESTIONS ASKED
1. Conservatism	3
2. Activities, interests	3
3. Financial	3
4. Physical	6
5. Family	4
6. Personality traits	4
7.. Attitude toward future	2
8. Best time of life	2
9. Insecurity	4
10. Mental deterioration	5
11. Sex	1
12. Interference	1
13. Cleanliness	1

Administration of the Survey

Applicants for occupational therapy and physical therapy undergraduate programs of one midwestern university school were surveyed. A total of 211 surveys were administered, 101 to occupational therapy applicants (out of a possible 128) and 110 to physical therapy applicants (out of a possible 122). The surveys were administered one full academic semester prior to the participants' date of entry into the respective program. Total anonymity was assured with the surveys being administered by individuals other than the investigators or program faculty. Applicants were given a choice as to whether or not to complete the survey.

Statistical Analysis

For all four sections, frequency distributions and chi square relationships were use to analyze data.

RESULTS

Incomplete survey forms were eliminated leaving 168 surveys for analysis from the original 211. Survey results are described using frequency tables and relationships made from and between the four categories: 1) demographic data; 2) past experiences and future work and clinical choices; 3) knowledge base; and 4) attitudes.

Demographic Information

Demographic data revealed that 86% of the respondents were female, and that 70% were between the ages of 18-21 years while 27% were between 22-30 years. The two disciplines (OT, PT) were evenly divided.

Past Experiences and Future Work and Clinical Choices

For statistical analysis, work and volunteer settings were grouped into larger cells indentified as those dealing with the chronically ill, acutely ill, or well elderly population, and those who had no contact with the elderly population. Of those surveyed, 63% had previous volunteer or social experience which included relatives, friends, and residents in senior centers. Seven percent indicated no previous volunteer/social experience with the older adult. (See Table I.)

TABLE I
Previous volunteer/social experience

TYPE	PERCENT
Nursing homes (chronically ill)	18
Hospital (acutely ill)	45
Relatives/friends (well)	28
Senior centers (well)	2
None	7

Thirty-three percent of those surveyed had worked in nursing homes and/or hopsitals, 2% with senior citizens' centers. The remaining 65% had a job with no contact or contact of unknown type. (See Table II.)

TABLE II
Previous work experience

TYPE	PERCENT
Nursing homes	11
Hospital	22
Senior centers	2
Others	27
None	38

Although the majority of the students would choose to work with older adults in a clinical setting on an occasional or half-time bases, only 5% would choose to deal with this population on a full-time basis. Five percent would choose not to deal with this population to any extent. Because of the small numbers of students endorsing both extremes, the group was dichotomized in the statistical analysis (>50% or <50%). (See Table III.)

TABLE III
Choice of future clinical rotations

TYPE	PERCENT
Exclusively with older adults	5
50% with older adults	52
Occasionally with older adults	38
Not deal with older adults	5

A fairly even distribution was shown for those who would choose to work 50% of the time or greater with the older adult and those who would choose to work 50% of the time or less with the older adult in the future work setting. Again 5% of those surveyed indicated they would not choose to work at all with this population. Again due to small numbers of students indicating exclusive work or no previous work with the older adult, the groups were dichotomized in the statistical analysis (>50% or <50%). (See Table IV.)

TABLE IV
Choice of future work setting

TYPE	PERCENT
Exclusively with older adults	3
50% with older adults	49
Occasionally with older adults	43
Not deal with older adults	5

Of particular note were those findings which compared the work and volunteer experiences segment of the survey. Significant was the finding which indicated that the majority of those who had work experience with the older adult would choose to work in a facility with older adults. Thirty-eight percent of those who said they wanted to work 50% or more of the time with the elderly had no experience with the elderly. However, 62% of those with no prior experience with the elderly would not choose to work with that population. Of those who had previous experience working with the older adult, the few in senior centers would choose 100% of the time to work with the older adult. Those in nursing homes had the next highest percentage of choosing to work with the older adult. (See Table V for details.)

TABLE V
Previous work experience/choice of future work setting with older adults

PREVIOUS WORK EXPERIENCE	% CHOICE OF FUTURE WORK SETTING WITH OLDER ADULTS	
	> 50%	< 50%
Nursing homes (11%)	63	37
Hospital (22%)	59	41
Senior centers (2%)	100	0
Other (27%)	56	44
None (38%)	38	62

p - < .05

On the other hand, no relationship appeared between prior volunteer experience and preference for future work experience.

Upon looking at the influence of work experience, a significant finding was that nearly 80% of those with previous work experience in a nursing home would select a future clinical rotation with the older adult. (See Table VI.)

TABLE VI
Previous work experience/choice of setting for future clinical rotation

PREVIOUS WORK EXPERIENCE	% CHOICE OF SETTINGS FOR FUTURE CLINICAL ROTATION	
	> 50%	< 50%
Nursing homes (11%)	79	21
Other responses (89%)	55	45

p - <.05

Of those indicating a preference for future clinical rotations with the older adult, the majority would also choose to work with the older adult in a future work setting. (See Table VII.)

TABLE VII
Choice of future clinical rotations/
choice of future work setting

% CHOICE OF FUTURE CLINICAL ROTATION	% CHOICE OF FUTURE WORK SETTING	
	> 50%	< 50%
> 50% (58%)	79	21
< 50% (42%)	14	86

p = <.001

Table VIII summarizes the significant findings regarding past volunteer and work experience as it relates to future work and clinical choices.

TABLE VIII
Significant findings

	P VALUE
1 - Previous Work Experience/Choice of Future Work Setting	(p = <.05)
2 - Previous Work Experience/Choice of Future Cinical Rotation	(p = <.05)
3 - Choice of Future Clinical Rotation/Choice of Future Work Setting	(p = <.001)

Knowledge Area

The third category dealing with the students' knowledge base revealed that 85% of the questions (17 out of 20) were scored correctly.

Attitudes

The last part of the survey dealt with attitudes toward the elderly and were analyzed according to 13 categories.

Of the 39 questions dealing with attitude, most of the student responses indicated a positive outlook on the older adult. The only obvious negative stereotype dealt with conservatism.

DISCUSSION

To supplement the information found in the literature review in which student were surveyed while in their professional programs, our study focused on work and volunteer experiences prior to entering the professional curricula. It was felt that if attitudes existed upon entering the program, these had come about or had been reinforced by prior volunteer and work experiences. The findings seemed to verify these beliefs.

The results demonstrated that pre-professional volunteer experience did not tend to guide the prospective health care professional's future decision to work with the elderly population. Work experience, where involvement with the elderly was unknown, also did not appear to have an effect on the decision to work with the elderly population. However, greater than half of those who had previous work experience in nursing homes, hospitals, etc., would choose to work 50% or more of the time with the elderly. Only 5% chose to work with this population on a full-time basis.

Since the majority of volunteer experiences occurred on a weekly basis for 3-6 months, it is postulated that this amount did not allow sufficient interpersonal contact to promote a positive effect. A brief weekly visit to a nursing home, for example, may only allow a volunteer enough time to be influenced by offensive olfactory, auditory and visual stimuli. However, those who had jobs with the elderly would presumably have had more contact hours in which to "get to know" individuals and see the positive qualities in spite of being in the midst of those less than desirable environments.

Since the population surveyed consisted of pre-professional occupational therapy and physical therapy students, it is also postulated that some of the volunteer work was seen by the student as "obligatory" to fulfill applicant requirements for admission to a professional program.

Surprisingly, past volunteer experience did not influence choice of clinical rotation. One experience may be that preprofessional students completing the survey did not fully understand the term "clinical rotation." Another speculation is that those who have decided to work with this population would like to spend their clinical rotations gaining exposure in other areas to "be more well-rounded professionals."

Overall, the responses indicated a positive attitude towards and a correct knowledge base of the "over-65" population.

The authors acknowledge that a representative sample of questions from Tuckman's questionnaire may not have been chosen. No factor analysis was done on items in the original questionnaire. In addition, a true-false format may not be as reliable an indicator as a Likert-type attitudinal scale. Further projects of similar kind, with appropriate modifications, are planned to provide the rationale, methodology and effects of incorporating gerontological content into professional curricula.

CONCLUSION

Due to the increasing numbers of "over-65" adults, it becomes imperative for professional educational programs to encourage more of their students to work with the older population. Professional health programs need to take a critical view of the quantity and quality of gerontological experiential content in their curricula. If experiences of a lengthy and regular duration do promote a desire to work with the elderly, as shown by this survey, then it seems logical to include these direct personal contacts with the over-65 population into professional allied health programs.

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NEEDS ASSESSMENT OF MEDICAL-SURGICAL CLINIC PATIENTS TO DETERMINE EFFECTIVE METHODOLOGY IN THE PRESENTATION OF NUTRITION AND HEALTH CONCEPTS

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ABSTRACT

Nutrition and health education must be effectively delivered to enhance clients' abilities to incorporate this new information into their lifestyles. Finding the most effective teaching method for the defined population is the desired goal of this study.

The study will address the following objectives: demographics of the defined population; determine the value the client places on nutrition and health information; specific information the client desires; and preferred education format, method and place of delivery. Patient samples included a randomized selection of 75 to 100 medical-surgical clients from the Ambulatory Care Department of St. Elizabeth Hospital Medical Center.

The survey instrument was developed by collaborative input from clinical dietetics, nursing and medical education. The questions reflect concerns from all three areas. During the pilot test questions were validated for clarity, content and appropriateness to assure desired data was obtainable.

Data collections were initiated in July. Each client was interviewed by a senior level student from Youngstown State University enrolled in Home Economics 801 (Clinical Nutrition). Students were trained in the interview process and supervised by hospital staff.

Questionnaires were statistically tabulated at the university and the final results shared with the appropriate departments in the hospital.

INTRODUCTION

Consumers nationwide presently demonstrate a greater interest in health and nutrition. The marketplace has responded to this interest with a variety of services and a host of products, such as lite and diet foods, low sodium and sodium free foods, so called "nutritionally balanced" products and caffeine-free beverages. As part of a growing proactive attitude, Americans have turned away from the traditional medical model of the "professionals know what is best for you", and are seeking systems that permit consumers to help themselves, discover their options with some measure of personal control.

It is in this spirit of concern for patient education that the medical surgical outpatient clinic was begun. As responsible professionals, we should be expected to expend our limited time, expertise, and energy on activities that are most worthwhile. Our focus must be on programs and services that can bring about change in the most efficient manner. Decisions needed to be made concerning whether the current level of nutrition and health education intervention was effective and if this service should be changed or expanded.

At the time of the study a dietitian was assigned clinic duty in addition to the in-house patient duties for the day. As the dietitian progressed through in-house duties, a paging system would alert the professional to a client waiting for instruction in the clinic. Because of the timing, a registered dietitian paged midway through an in-house patient instruction or conference, and the distance factor, clinic patients were many times delayed in leaving the hospital. Nurses included health education as time permitted and upon questions from the client. No organized health information classes for this clinic population exist at this time. All of the above factors began impacting upon ongoing communication between the departments. Collectively the idea grew that there may be a better way to deliver this service. The question then became, "does the consumer desire a service different from the service offered?" Looking at the consumer of this service became important.

A review of the literature indicated some areas of special concern. Because health and nutrition information is "very available" in the mass media, a major problem for the professional is how to combat food faddism and health misinformation. Skillfull presentation of new and accurate information over time is one effective method[7]. The professionals must always have the highest regard for the clients' self-esteem and self-image. Pace[19] suggests one or two exposures to this new information will not result in long-term changes. Clients require follow-up for lasting change.

Radio and television are current realities in public education that consumers react to favorably. However, care must be exercised to develop the message for the intended listener[2]. Not only is the content of the message important but the time frame is equally important. Boyd[20] found that no matter how creative or important the message, people will not be attentive for more than 12 to 15 minutes. Television is the major source of nutrition and health information for women of all ages and respondents over 40 years of age[14].

Written nutrition information in the form of books, newspapers, and magazines were the most frequently used by adults in a South Carolina study[13]. This source was rated the second most credible however. The physician was regarded as the most credible. As physicians made referrals to dietitians and therapy, transferring the credibility of the physician to the dietitian, it was possible to utilize written media and reach a large number of clients/consumers.

It is estimated that 7 million people in the United States over the age of 25 are functionally illiterate, meaning they have fewer than five years of school. Since most people can be expected to protect themselves and hide their inability to read; educators must translate scientific findings into very practical recommendations[10].

Mini demonstrations have been found to have several advantages over other teaching methods. Many consumers prefer a shorter more direct method to learn; demonstrations can provide this. This method is also more likely to be conducted in a small group setting which also provides peer support. This added socialization has advantages for the client who may be living alone.

PURPOSE/GOAL

Purpose: Survey the clinic population to determine the most effective teaching method to deliver health and nutrition information.

Goal: Meeting the wants and/or needs of the identified population to assist them in adoption and maintenance of positive lifestyles is the desired goal of the study.

OBJECTIVES

1. Demographics of the defined population
2. Value the clients place on nutrition information
3. Value the clients place on health information
4. Specific information the client desires
5. Education format desired by client
6. Desired methods and place of delivery by client

METHODOLOGY

An interdisciplinary approach to the study was employed. Participation by the Head Nurse and Administrator of the Medical-Surgical Clinic was coordinated by the joint efforts of the Assistant Director of Nutrition Services, Clinical Division and an Associate Professor from Youngstown State University's Coordinated Undergraduate Program.

LIMITATIONS OF THE STUDY

The population was limited to Medical-Surgical patients, ages 19 to 71 and over. All clients were requested to participate in the study but it was not mandatory.

POPULATION

Eighty-seven Medical-Surgical clinic patients were interviewed by eight senior dietetics students. The oral questionnaire was administered by the students on an individual basis for five days over a two week period. All clients reporting to the clinic on these randomly selected days had an opportunity to participate in the survey, although some chose not to participate.

DATA COLLECTION INSTRUMENT

The survey form was developed by the interdisciplinary group to encompass the concerns and objectives of the study. The student interviewer read the questions to the client and recorded their answers. A training session had been held for the interviewers by Miss Louisa Marchionda, at the University.

RESPONSIBILITIES

Once the survey form was developed to the satisfaction of the interdisciplinary group; the training of the students began at the University. By mid July the data collection began over a two week period at the Hospital. University faculty and the Nursing Supervisor were available at all times during data collection to observe and assist as needed. Upon completion of data gathering the students entered all the data into the University Mainframe Computer. Analysis of the information was completed using the program available. The students studied the results and began development of illustrations to visually display the data. They had also worked on the review of literature as part of their course work relating to the research process.

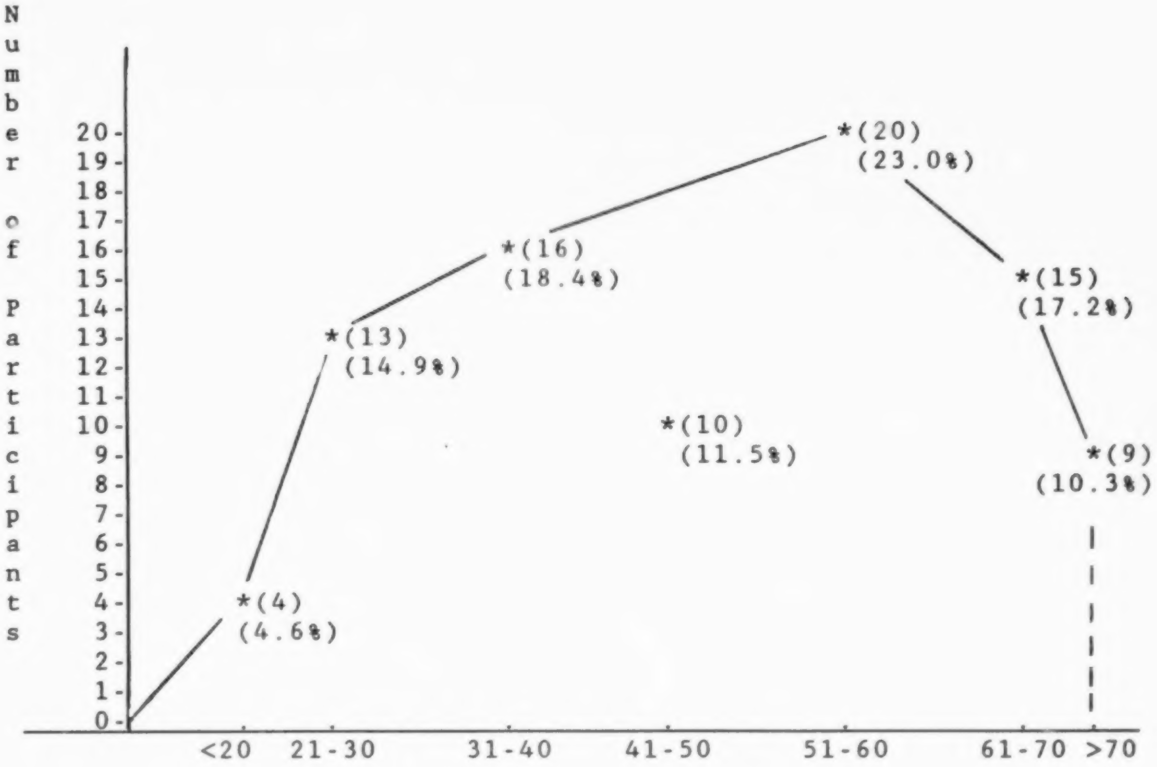
Final summarization and evaluation of data was completed by the authors.

RESULTS

Clinic patients ranged in age from 19 to over 71 years of age (see Table 1). The largest group within the age ranges was the 51-60 age group, the smallest was the under twenty group. Sixty-three of the group were female and twenty-four were male. The married group was largest with twenty-seven individuals, seventeen were single, seventeen divorced, sixteen widowed and ten separated. Individuals indicating they lived alone represented 28.7% of the group.

TABLE I

Study of participants by age groupings



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High school represented the highest level of education for 53.6% of the group. However, 1.2% had a Bachelors Degree and 6% an Associate Degree. Junior high school represented 28.6% and grammar school 10.7% of the total group. Seventy-one people were not employed, two were employed part time. The remaining fourteen held a variety of positions; one person was a skilled laborer.

When questioned about language, eighty-five responded they were comfortable speaking English. They also indicated comfort in speaking other languages, however the comfort level of reading other languages was very low. People able to read were comfortable reading English.

A total of twenty respondents stated they followed a special diet at home. When asked to identify the diet followed, low sodium was the largest group, followed by the diabetic diet, low fat-low cholesterol and weight reduction. When asked the length of time they had been on a special diet, 38.8% had been less than two years; 25.8% from two to five years; 35.4% more than five years.

When questioned if they would participate in a nutrition and health information program if there was a minimal charge; fifty-four (54) individuals said "yes". The current sources of health information most helpful to this population were the physician, 61.2%; television, 50.6%; newspapers and magazines tied at 20% each; radio and the dietitian tied at 14.1%; with the nurse at 12.9% (see table 2). When questioned who the person with the most influence on their health behavior was; the physician ranked first with 47.7% and "yourself" was 40.7%

INFORMATION DESIRED

The type of nutrition and health information desired by this population is shown in Table 3. A desire to learn about their disease process and medications rated highest. General wellness information and meal planning information followed closely behind.

FORMAT/PLACE AND TIME

How to best deliver information was a concern for professional staff. Over two-thirds (68.7%) of the respondents indicated they desired receiving a copy of the diet and talking to a Registered Dietitian. The hospital was the highest rated location for these activities.

Monday, Wednesday followed by Tuesday; mid-morning and mid-afternoon were the days and times most desired by the population.

TABLE II
HEALTH INFORMATION SOURCES

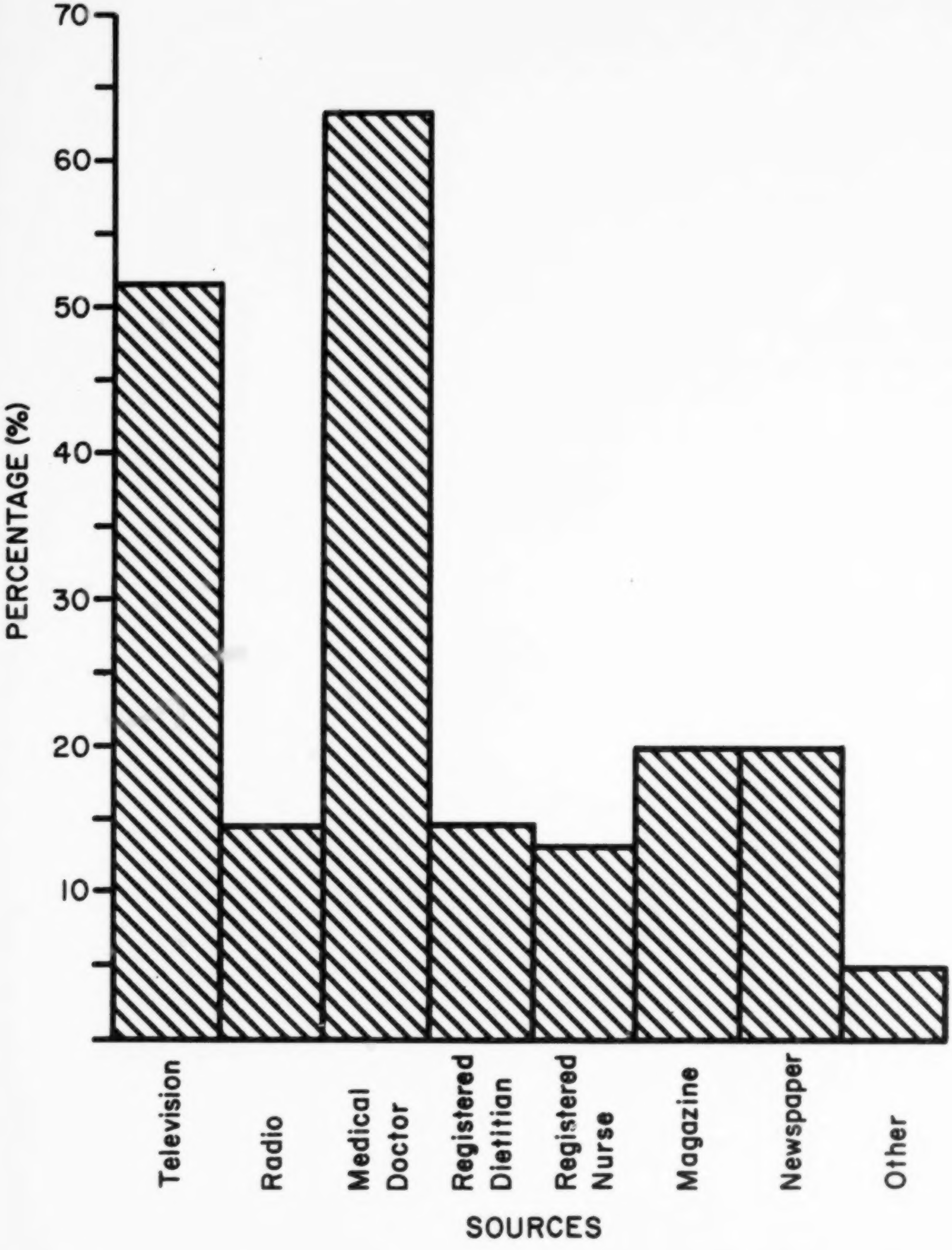

TABLE III

INFORMATION DESIRED BY THE SAMPLE

ITEM	VERY IMPORTANT	IMPORTANT	NO FEELING	SLIGHTLY IMPORTANT	NOT IMPORTANT AT ALL
MEAL PLANNING	31.0(27)*	35.6(31)*	13.8(12)*	3.4(3)*	16.1(14)*
YOUR DISEASE PROCESS	58.6(51)*	31.0(27)*	4.6(4)*	2.3(2)*	3.4(3)*
HOW TO STAY WELL	52.3(45)*	38.4(33)*	2.3(2) *	3.5(3)*	1.2(1)*
LEARN ABOUT MEDICINE	55.2(48)*	37.9(33)*	3.4(3)*	1.1(1)*	2.3(2)*
HOW SMOKING AFFECTS YOU	20.7(18)*	25.3(22)*	17.2(15)*	9.2(8)*	23.0(20)*
HOW DRINKING AFFECTS YOU	19.5(17)*	21.8(19)*	18.4(16)*	9.2(8)*	28.7(25)*
COPING WITH MINOR HEALTH PROBLEMS	26.4(23)*	39.1(34)*	11.5(10)*	8(7)*	11.5(10)*

*( ) INDICATES NUMBER OF RESPONSES

DISCUSSION

It is encouraging to note that patients would be willing to return to the hospital for classes on health and nutrition information. Further, they would like follow up by the dietitian. Reinforcement of nutrition and health principles, utilizing in-house videos on health and nutrition topics already identified, could make waiting time educational and enjoyable.

A number of problems were identified throughout the course of the study. These are listed below.

PROBLEMS IDENTIFIED

1. Lack of question concerning transportation
2. Identification of what is a minimal charge
3. Complications of statistically analyzing the complex questions
4. Some inconsistency in data gathering by the students

RECOMMENDATIONS

The interdisciplinary effort of the research study identified a true interest in health and nutrition education issues. The following recommendations are offered from this study:

1. Development of efficient program encompassing diet verification, counseling and follow up.
2. Suggest a larger study be conducted on the entire clinic population to verify the pilot findings.
3. Based on students' observations, utilize clients waiting time with video presentations of nutrition and health information.
4. Develop 10 to 15 minute video presentations on topics identified during the study.
5. Eventually assign a technician to the clinic for initial contact with client and scheduling an appointment with the dietitian.
6. Initiate video programs.

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A STUDY TO DETERMINE PEDAGOGICAL NEEDS IN CLINICAL EDUCATION

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ABSTRACT

A guide and a set of 10 modules were developed for the purpose of providing staff development for health occupations clinical educators. The development of the modules was initiated in 1980 when the Illinois Health Occupations Education Joint Staff identified the need to improve clinical education. The need was verified by the Illinois Health Occupations Advisory Committee. In February, 1984, the Illinois State Board of Education, Department of Adult, Vocational and Technical Education funded a research proposal submitted by the University of Illinois, Urbana-Champaign, to develop and disseminate materials for providing staff development in clinical education.

The initial phase of the research project involved an assessment of the needs of health occupations clinical instructors in the state. Following a review of the literature, 39 directors and 110 clinical instructors of health occupations programs were surveyed to determine the greatest needs in clinical education. The types of programs surveyed were dental hygiene, dental assisting, medical records, medical laboratory technology, occupational therapy assisting, emergency medical technology, pharmacy technology, physical therapy assisting, practical nursing, associate degree nursing, radiologic technology, respiratory therapy, operating room technology, and secondary programs.

The library search revealed that teaching modules specific to clinical education were not available. With the support of a panel of health occupations experts, ten modules were developed in the areas of clinical teaching, supervision, and evaluation. Each module was field-tested by a variety of secondary and post-secondary health occupations educators at 30 different field-test sites.

It was also determined that a leader's guide would be necessary to facilitate the implementation process and provide suggestions for use of the modules. The complete module package is designed for use by all those responsible for teaching and/or supervising health occupations students in the clinical area.

INTRODUCTION

Instruction in clinical education was identified as a need by health professionals in Illinois. In 1983 the Health Occupations Advisory Committee and the Health Occupations Joint Staff advised the Illinois State Board of Education that there was a need for upgrading clinical supervision in all health education program clinical settings. These two committees were comprised of leading educators and health care industry administrators who were considered to be experts in the health field. Consequently, the Illinois State Board of Education, Department of Adult, Vocational and Technical Education funded a research project (Shea, 1984) to address the problem.

RATIONALE

Illinois had more than 1,400 health occupations teachers employed in high school, adult, and community college federally funded health education programs. Moreover, numerous health practitioners who were employees of hospitals, nursing homes, clinics, etc., assisted the schools in the clinical teaching of students enrolled in health programs. Many of these individuals never had benfit of formal, didactic teacher education or informal staff development activities about methods of teaching clinical education. Those with formal teacher education seldom received instruction peculiar to clinical teaching.

Clinical education is an integral part of all health occupations education programs. Students frequently spend more time in clinical learning than in the school classrooms and laboratories. Considerable emphasis had generally been given to classroom instruction, including development of measureable objectives, lesson plans, visual aides, evaluation instruments, etc. However, in comparison, little attention was paid to clinical education. In the clinical setting, students were often taught and supervised by employees of the health facility. These people were usually competent practitioners, but did not view themselves as teachers. If the patient workload was great, these supervisors sometimes neglected the students or assigned them to repetitive, mundane jobs to occupy their time. Hence, clinical education was not receiving the quality attention that it should.

Ruth Ann Looby, Director of Nursing, Lakeland Community College, Mattoon, Illinois, and Duane Garver, Director of Nursing Service, St. Mary's Hospital, Decatur, Illinois, expressed a need for improving competences of clinical teaching in both school and hospital staff. Most experts agreed that health occupations education programs exhibit unique strengths in cooperation between the school and industry. They emphasized the need to improve the competencies for teaching and evaluating students in the clinical setting.

The purpose of the study was to develop materials and procedures to improve clinical education in Illinois health occupations education programs. The ultimate goal was to provide better instruction to students.

PANEL OF EXPERTS

A panel of experts was selected to advise the researcher in all aspects of the projects. A number of criteria were used in selecting the members These were:

- Geographic location - it was important to have individuals representing various regions of the state.
- Technical expertise - must possess appropriate credential in at least one health profession and possess a higher degree.
- Type of institution - a broad representation of types of schools and health care facilities was required, i.e., community college, area vocational center, high school, nursing home, hospital.

The Panel of Experts and Joint Staff Committee advised the researcher to develop modules to assist clinical teachers in pedagical skill areas.

LITERATURE SEARCH

The purpose of the search was to:

- locate models for conducting needs assessments
- review results of previous needs assessments and studies in clinical education
- search for staff development materials for clinical education
- document references to use when writing materials

The sources searched were:

- ERIC Computer Search
- Medline Computer Search
- Current Index to Journals in Education (CIJE)
- Cumulative Index for Literature in Nursing and Allied Health
- University of Illinois Education Library
- University of Illinois Health Sciences Library

The literature search revealed a variety of needs assessment models (Bell, 1978; Ebrite, 1982; Ingersoll, 1976; Laxdal, 1982; Shea, 1980). These models were analyzed for techniques (instrument design) in conducting the survey.

Clinical education studies were reviewed to determine categories of competencies needed by clinical instructors (Casberque, 1978; Irby, 1977; O'Shea, 1979). From this review it was determined that clinical instructors should possess competencies in the categories of instructor knowledge, professionalism, clinical supervision, teaching, and evaluation.

These categories and, subsequently, competencies were used in developing the survey instrument.

The search revealed that there were no learning modules in clinical education developed for teachers.

INSTRUMENTATION

Based upon the literature search and information from the Panel of Experts, a needs assessment instrument was designed to determine the strengths and weaknesses of clinical educators. Five key questions were addressed in this assessment:

1. What are the educational and professional backgrounds of the clinical instructors in Illinois?
2. Which categories of clinical teacher competencies are most important for clinical instructors?
3. In which categories of clinical teaching competencies do clinical instructors require the greatest improvement?
4. To what extent is each clinical teaching competency important for clinical instructors?
5. To what extent do clinical instructors require improvement in each category?

PROCEDURES

The instrument was field-tested at five different sites having health occupations programs. The program directors received six surveys with cover letters to be completed by themselves and five clinical instructors. A good return rate from the field-testing revealed that the methodology seemed appropriate for use when conducting the actual needs assessment.

The final instruments and cover letters were sent to 64 directors of secondary and post-secondary health occupations programs selected at random from a list provided by the Illinois Department of Adult, Vocational and Technical Education. Concurrently, phone calls were made to the directors to emphasize the importance of the needs assessment to improve response rates.

DATA ANALYSIS

The data collected from the returned surveys were tabulated and analyzed utilizing the Statistical Package for the Social Schiences (SPSS) and the Cyber Computers System at the University of Illinois, Champaign.

The surveys returned represented 13 different health occupations programs.

Table 1: Surveys Returned From Programs

Program Type	Number Returned By Program Directors	Number Returned By Clinical Instructors
Secondary	6	8
Post-secondary		
Dental Hygiene	2	9
Dental Assisting	2	1
Medical Records	2	1
Medical Laboratory Technology	5	14
Occupational Therapy	1	1
Emergency Medical Technology	1	2
Pharmacy Technology	0	1
Physical Therapy	1	7
Practical Nursing	3	3
Associate Degree Nursing	8	38
Radiologic Technology	5	13
Respiratory Therapy	4	12
Operating Room Technology	1	0
	41	110

Thirty-nine program directors and 110 clinical instructors responded.

CONCLUSIONS

Following are the conclusions and supporting evidence regarding each of the five key questions:

Key Question #1: What are the educational and professional backgrounds of the clinical instructors in Illinois?

Conclusion(s) / Supporting Evidence

1. The educational preparation of clinical instructors is widely varied.

1a. In item #2 of Part I of the clinical instructor questionnaire the group varied as follows:

Highest educational level	# of Respondents
High school graduates or less	0
0-2 years post-high school	8
Greater than 2, but less than baccalaureate degree	17
Four-year college graduate	18
Some graduate credit	24
Graduate or professional degree	41

2. Most clinical instructors are employed approximately half-time as clinical instructors.

2a. As indicated in item #3, the mean number of hours per week clinical instructors spend in clinical instruction/supervision is 18.8.

3. The majority of clinical instructors teach in a hospital setting with few teaching in other settings.

3a. The data obtained in item #4 is as follows:

Setting	# of Instructors teaching in setting
Hospital	84
Nursing home	11
Private office	0
Clinic	9
Other (laboratories)	5

Key Question #1 (Cont.)

Conclusion(s) | Supporting Evidence

4. Clinical instructors have adequate occupational and clinical teaching experience in their fields.

4a. As indicated in item #5, clinical instructors have an average of 9.35 years occupational experience in their respective occupations.

4b. Responses to item #5 indicated a slightly lower mean number, 6.77, years of clinical teaching experience.

5. Clinical instructors have participated in numerous types of activities in the past five years to specifically improve their teaching skills. Most used educational workshops and reading materials

5a. The data obtained from item #7 regarding educational activities and major activities are as follows:

Activity	# Instructors indicating participation	# Instructors listing major activity
Workshops	99	67
Professional meetings	85	30
Formal coursework	61	35
Reading materials	98	61
Others (clinical practice)	14	11

Key Question #1 (Cont.)

Conclusion(s)

6. Educational workshops, formal coursework and reading educational materials were the primary preferred activties.

Supporting Evidence

6a. For item #8 regarding preferred activities, the responses were ranked as follows:

Rank	Activity	# indicating preference
1	Workshops	94
2	Formal coursework	63
3	Reading materials	58
4	Professional meetings	43
5	Others	9
	No preference	7

Key Question #2: Which categories of clinical teaching competencies are most important for clinical instructors?

Conclusion(s)

1. All categories of clinical teaching competencies were rated as being very important by both the program directors and clinical instructors. Clinical supervision skills and professional characteristics were considered to be the most important categories.

Supporting Evidence

1a. Both the program directors and clinical instructors were surveyed to determine their ratings of the importance of each of the competencies. All categories were rated very high. The rank and overall mean ratings for each category are as follows:

Rank	Category	Mean Rating
1	Clinical Supervision	4.71
2	Professional Characteristics	4.70
3	Instructor Knowledge	4.62
4	Clinical Teaching Skills	4.58
5	Clinical Evaluation	4.45

Scale: 1-Do not know
1-Not at all important
3-Somewhat important
5-Very important

The data revealed that clinical supervision and professional characteristics were perceived to be the most important categories of competencies.

Key Question #3: In which categories of clinical teaching competencies do clinical instructors require **greater improvement?**

Conclusion(s)

1. **Clinical instructors have some need in each of the five categories of competencies. Clinical teaching skills and instructor knowledge are the categories of greatest need.**

Supporting Evidence

1a. The overall mean ratings of each category were determined and the categories ranked as follows:

Rank	Category	Mean Rating
1	Clinical Teaching Skills	2.75
2	Instructor Knowledge	2.69
3	Clinical Evaluation	2.59
4	Professional Characteristics	2.53
5	Clinical Supervision Skills	2.36

Scale:
0-Do not know
1-Not at all important
3-Somewhat important
5-Very important

Key Question #4: To what extent is each clinical teaching competency important for clinical instructors?

Conclusion(s)	Supporting Evidence
1. All of the clinical teaching competencies were rated as being highly important for clinical instructors.	1a. The composite mean ratings of the clinical teaching competencies for both program director and clinical instructors ranged from 3.91 to 4.94 indicating a moderate to high level of importance.
2. Clinical teaching competencies that were considered to be most important related to actual instructor competence in teaching, supervising and evaluating students as well as personal qualities of the instructor	2a. Composite mean ratings were calculated from both the program director and clinical instructor surveys. Clinical teaching competencies from each category that were considered to be most important were:

Category	Competency	Mean rating
A. Instructor Knowledge	2. Demonstrate skill & judgement in practice of the profession	4.94
B. Professional Characteristics	3. Keep up-to-date with the profession	4.90
	4. Demonstrate ethics	4.89
	5. Act as a role model	4.88
C. Clinical Supervision Skills	6. Available to students	4.82
	7. Demonstrate an interest in students	4.87
D. Clinical Teaching Skills	13. Give students positive reinforcement	4.84
	18. Demonstrate enthusiasm	4.84
E. Clinical evaluation	4. Evaluate students according objectives	4.77
	5. Provide verbal and/or written feedback to students	----
	6. Make specific suggestions to students when performing skills	4.78

Key Question #5: To what extent do clinical instructors require improvement in each clinical teaching competency?

Conclusion(s)	Supporting Evidence
1. There is "some need" for improvement in each of the clinical teaching competencies.	1a. All of the clinical teaching competencies were rated within the range 2.03 to 3.04, indicating that clinical instructors have some need for improvement in each.
2. The clinical teaching competencies of greatest need vary and are in all categories except clinical supervision.	2a. The composite mean ratings for competencies of greatest need are as follows:

Category	Competency	Mean rating
A. Instructor Knowledge	3. Discuss current developments in the field	3.04
B. Professional	3. Keep up-to-date with the profession	3.01
D. Clinical Teaching	11. Formulate questions to elicit understanding	2.86
	14. Provide instruction for slower and more capable learners	3.01
	16. Direct students in applying problem-solving skills	2.81
E. Clinical Evaluation	2. Utilize appropriate instruments to evaluate student attitudes	3.02
	3. Develop clinical evaluation instruments	2.95

RECOMMENDATIONS

The primary purpose of the needs assessment was to provide information that could be used for determining the content of the staff development modules.

The data obtained were also useful for planning future staff development activities for clinical instructors.

The results of the study provided evidence that clinical instructors had varied educationl and occupational backgrounds, the majority were employed in hospital settings. Clinical instructors were in need of well-planned staff development modules and other activities should include preparation in the competencies needed for effective clinical instruction. Primary focus should be placed on competence in which the target group of clinical instructors require greatest improvement. Specific recommendations are:

1. The modules and other staff development activities should be developed to meet the needs of individuals from all types of secondary and post-secondary health occupations programs.
2. The instructional modules should include all five categories of clinical competencies: instructor knowledge, professional characteristics, clinical supervision skills, clinical teaching skills, and clinical evaluation, as they are deemed important.
3. Primary focus should be placed on the competency category of greatest need - clinical teaching skills.
4. Activities regarding current trends in health-care should be provided for clinical instructors to help them keep up-to-date with their field.
5. The modules should include activities that help clinical instructors develop skills in problem-solving, individualized instruction, and questioning, as these are the areas of greatest need.
6. The modules should include strong emphasis on affective characteristics of the clinical instructor and assisting students to develop appropriate affective behavior.
7. Activities should be included that provide clinical instructors with skills in developing and utilizing clinical evaluation instruments to measure skills and attitudes.

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PLANNING FOR THE FUTURE: AN INTERDISCIPLINARY APPROACH WITHIN A DIVISION OF ALLIED HEALTH

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ABSTRACT

The health care system's dynamic nature requires that programs preparing health care professionals monitor and update curricula to reflect the system's changing needs. To be effective, program planning must be accomplished systematically and based on relevant data. In response to these needs, the Mercy College of Detroit allied health faculty developed a collaborative research approach which identified changes impacting the programs.

An interdisciplinary planning committee used a modified Delphi approach to gather data and achieve consensus among Divisional faculty. A literature review resulted in a list of potential changes. The list was reviewed and revised based on faculty input obtained in personal interviews. A final rating of the revised list resulted in the identification of a list of potential developments most likely to occur within the next three years. These results formed the basis for Division goals and objectives which were reviewed and approved by faculty.

Important outcomes of this research included development of a planning model and goals and objectives which will guide future division growth and development. The model will provide a systematic and cyclic approach to future program planning. The Division goals and objective will provide guidelines for the growth and development of the Division, the faculty, and individual programs. Furthermore, the model will foster collaboration among faculty and the development of interdisciplinary offerings.

INTRODUCTION

In an era of rapid change, academic institutions have responded to internal and external environmental factors by engaging in strategic planning to chart methods for accomplishing institutional missions. This planning impacts all segments of academic institutions. Various programs and disciplines within colleges and universities are asked to indicate how they will assist the institution in accomplishing its mission and goals. Allied health programs, divisions, and schools are included in this process. Knowing the likelihood for involvement of allied health programs and faculty in institutional planning, a model and process for carrying out this planning is presented here.

Spurred by the need for a systematic approach to determining institutional goals and methods for accomplishing them, the Mercy

College of Detroit community, in 1984-1985, participated in an environmental review which culminated in development of the first phase of a strategic plan for the College. The environmental review was the result of collaborative efforts of faculty from all academic divsions of the college as well as administrators and staff personnel. The review was performed to identify changes and opportunities for the institution to capitalize on using its existing academic program strengths as well as to address weaknesses during the next five years. Results of the environmental review led to the formulation of a number of institutional goals for the period 1985-1991.

Among the institutional goals determined for the academic segment of the college community was a goal "To maintain a leadership position in health care education while developing additional educational activities that meet community needs and demonstrate potential for growth or leadership." In order to accomplish this goal, several objectives were set for the academic divisions. One objective had specific impact on the Division of Allied Health. That objective was: "To develop a plan for adapting the Allied Health curricula to the changing needs of the health care system." The dynamic nature of the health care system requires that programs preparing health care professionals constantly monitor and update curricula to reflect the system's changing needs. To be effective program planning must be accomplished systematically and be based on relevant data. In response to the internal challenge set forth by the institutional objective and to the external forces of a rapidly changing health care environment, the Allied Health faculty at Mercy College of Detroit developed a collaborative research approach that involved all Division faculty in identifying changes impacting the programs.

THE PROCESS

A strategic planning committee comprised of four Allied Health faculty representing various allied health programs developed the planning model to be used for adapting allied health curricula to the changing needs of the health care system. The strategic planning committee used a collaborative process to assess the present environment, to anticipate changes in health care and to formulate Division goals and objectives to be used to guide adaptation of the Allied Health curricula. In this process parameters, procedures and time lines for the work of the committee were developed with the objective of establishing a planning model for the Division. The guidelines were then reviewed, discussed and approved by the entire divisional faculty.

The committee recognized that a review of the philosophy statement of the Division of Allied Health was needed. After reviewing the college mission and goals and receiving input from all allied health programs, the philosophy statement was revised. It was then reviewed, discussed and approved by the faculty. The approval of the philosophy was facilitated by utilization of concepts integral to all the programs.

With revision of the philosophy statement, the next step of the planning process was that of assessing the changing needs in the health care environment. The committee began to look at the literature concerning trends and changes in the health care delivery system. The committee examined reports of the federal government, state government and a variety of professional organizations.

The literature review identified a research project conducted by the College of Health Deans of the American Association of Allied Health Professions. This research, consisting of a five round Delphi Study, provided a starting point for the Mercy College research. The committee recognized the need to conduct another Delphi study because of the lapse of time since the original study, the need for geographic relevance and the necessity of actively involving faculty in the process.

The original Delphi study developed a list of potential developments in health care which had potential impact of allied health programs. The committee used this list as a beginning point in collecting specific data from Allied Health faculty at Mercy College. Through personal interviews, all Allied Health faculty responded to the question "What are the major developments in health care that impact the preparation of professionals in your field?"

Using the responses of all division faculty, the committee refined the list of potential developments in health care. This refined list was then circulated to the division faculty in the form of a questionnaire in which faculty were asked to rate the developments on a scale of likeliness of occurrence within the next three years. Ninety-four percent of the faculty responded to the request for rating the potential developments.

The committee reviewed the compiled results and clustered the potential developments into groups based on major conceptual themes. Five groupings occurred. These groupings became the foundation for the formation of goals for the Allied Health Division. Objectives to accomplish the questionnnaire goals, the process of clustering into conceptual groups, and the resultant formulation of goals and objectives were presented to the allied health faculty. Faculty discussed the goals and objectives and were asked to further review them and submit written approval and comments to the committee. Seventy percent of the faculty representing all the programs gave their endorsement to the goals and objectives for the Division. As a result of this planning process, a planning model was developed and refined. Because the model requires the assessment of both the national health care environment and local conditions, it may be useful to others involved in strategic planning for allied health programming.

THE MODEL

The planning model may be looked at as a self-perpetuating cycle with entry points at the review of the philosophy, the assessment of the health care environment, and the evaluation of the curricula (Figure 1).

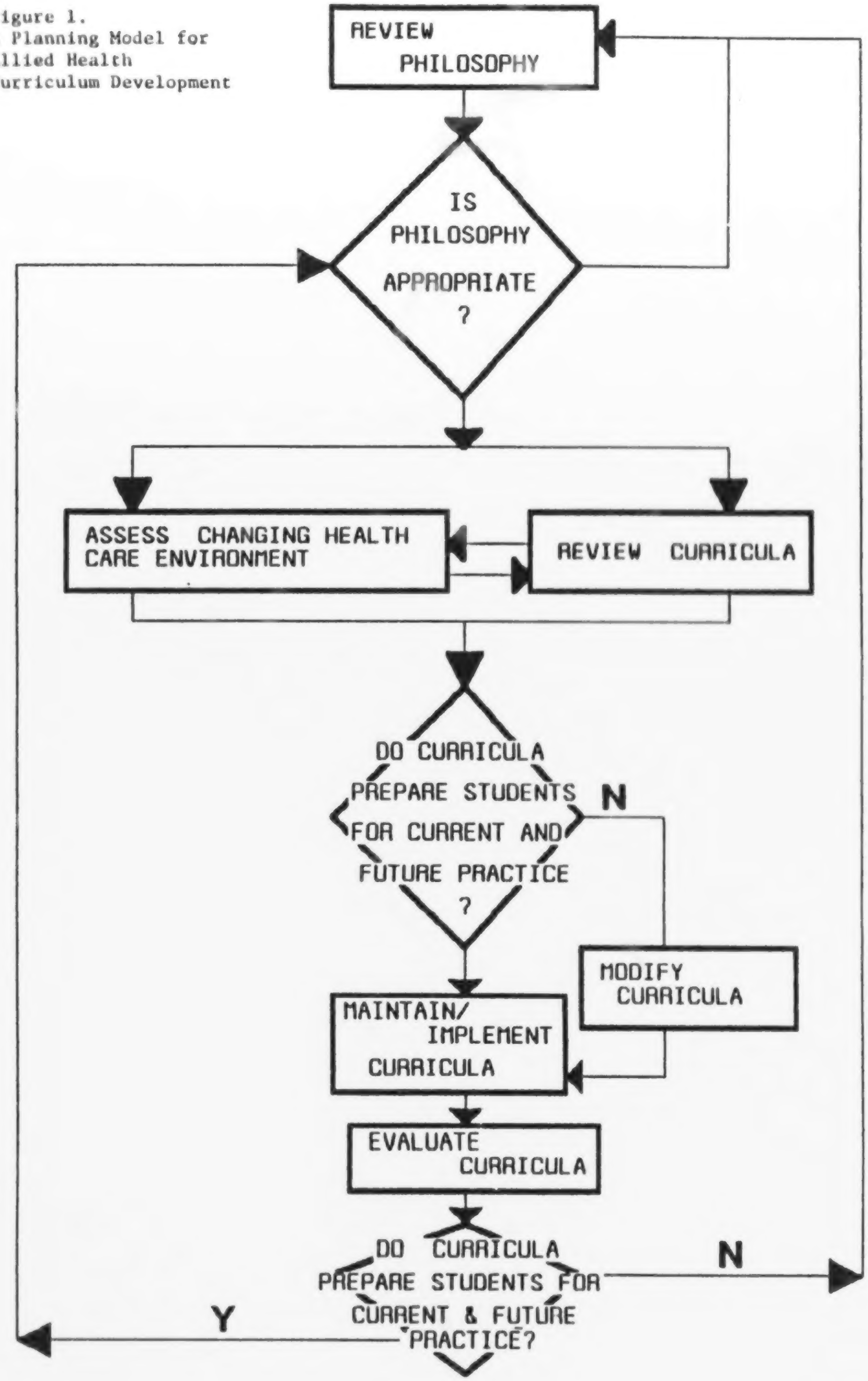
Philosophy, curricula and health care environment are seen as pivotal areas in the model with each having tremendous impact on each of the others. A change in any one of these three components of the plan will necessarily result in changes to the other two. While the philosophy of the Division is not expected to change yearly, each change that is contemplated must be preceded by a review of the philosophy to determine if the change is consistent with our beliefs and values. If the anticipated change seems to conflict, it may become necessary to revise the philosophy. In any case, reviewing the philosophy before any alteration of curricula is attempted will assist those who undertake the change by giving focus to their work.

All curricula undergo constant fine tuning but changes in the needs of the health care environment, a resurging, strong demand in academic institutions for added studies in the humanities and liberal arts and recent modifications in accreditation essentials mandate major curricular changes. The health care system with its current emphasis on quality care within a framework of cost efficiency has necessitated major revamping of the content of professional education. We can probably expect that significant alterations will continue to be required as the system moves relentlessly toward the corporate business approach to health care. These types of activities demand more than fine tuning; major curricular rethinking and restructuring must be undertaken to meet the challenges ahead.

The philosophy and curricula must balance against the needs of the health care environment. They must reflect the needs of the system and yet, continue to mirror the philosophy of the academic institution which prepares the student. The curricula must be planned and managed so that they produce students who are ready to function in the current system and who are able and willing to move into uncharted frontiers of health care.

The model suggests that each year an interdisciplinary group of allied health faculty meet to review the philosophy and determine whether or not it needs revision. If revision is needed because the College has revised its philosophy or the Division has undergone major changes in focus, an updated philosophy will be prepared. Input from all allied health faculty will be sought. A new philosophy will be accepted when approved by the faculty in the Division. The next step will require an assessment of the changes occurring in the health care environment that will have impact on professional practice. A variety of research techniques may be used to assess the changing environment. Some of these include literature review,

Figure 1.
A Planning Model for
Allied Health
Curriculum Development


REVIEW PHILOSOPHY
IS PHILOSOPHY APPROPRIATE ?
ASSESS CHANGING HEALTH CARE ENVIRONMENT
REVIEW CURRICULA
DO CURRICULA PREPARE STUDENTS FOR CURRENT AND FUTURE PRACTICE ?
N
MODIFY CURRICULA
MAINTAIN/ IMPLEMENT CURRICULA
EVALUATE CURRICULA
DO CURRICULA PREPARE STUDENTS FOR CURRENT & FUTURE PRACTICE?
N
Y

questionnaires, interviews and Delphi. Faculty provide an essential source of data. Additionally, it is desirable to collect data from other constituencies. Since programs generally have advisory committees that include practitioners and interested professionals and/or consumers, the necessary outside counsel will also be obtained. In addition, evaluations from students and affiliating agencies may be examined to aid in the decision making process. The information obtained from these sources will be the foundation upon which curricular changes will be made.

Having assessed the current and expected health care environment, each affected program will be asked to review its curriculum for relevance and agreement with the results of the information gathered from the assessment. After program faculty review the findings and decide upon the changes that will be needed to update their curriculum, they will revise or develop the curriculum to include the new content or processes. Major curricular revision will then be submitted to the division faculty for discussion and final approval before being submitted to the college curriculum committee. Minor revisions will be reviewed and discussed only with the divisional faculty.

After curricular changes have been made and students have completed the coursework that has been modified, evaluations of the success or relevance of the changes will be made. If these evaluations show that the modified curricula are still not appropriate to the needs of the student and the health care system, the cycle will begin again. While the philosophy probably would not need revising at this point, all work will begin with a review of it to assure that changes reflect the philosophy.

It is absolutely critical that all faculty be involved in decision making at each phase of the process in order that change be accepted. This includes involvement in philosophy revision, research, assessment of goals and objectives, setting curricular revision and evaluation.

OUTCOMES AND EXPECTATIONS

Important outcomes of this research included development of a planning model as well as goals and objectives which will guide future growth and development in the Division of Allied Health. The model will provide a systematic and cyclic approach to program planning. The goals and objectives will provide guidelines for the growth and development of the Division, the faculty and individual programs. Through identification of common needs of the allied health programs, common solutions will be sought. Collaboration among faculty and development of interdisciplinary offerings will be fostered.

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POSTER SESSIONS

Seven poster sessions were given to briefly present a variety of research studies:

Quantitation of Somatomedin-C (SM-C): A Possible Marker of Gains in Body Weight (BWT) and Lean Body Mass (LBM).

Weekly Interdisciplinary Patient Care Rounds

Health Risk Appraisal

A Study of Bioprosthetic Heart Valves Recovered from Humans

Reliability of Isokinetic Endurance Tests

Functional Capacity of Patients Prior to and after Bone Marrow Transplant

Measurement of Oxidation Reduction Potential and Conductivity of Human Lymphocytes Following Binding by Antibody

QUANTITATION OF SOMATOMEDIN-C (SM-C): A POSSIBLE MARKER OF GAINS IN BODY WEIGHT (BWT) AND LEAN BODY MASS (LBM)

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INTRODUCTION

The purpose of this investigation was to determine the effects of a high carbohydrate diet (HIGH CHO) and a moderate carbohydrate diet (MOD CHO) upon the lean body mass (LBM) of men who trained with heavy weights.

The research questions that were posed: 1. Will dietary manipulation cause a difference in LBM while training with heavy weights? and 2. Is there a relationship between dietary manipulation, increased serum somatomedin-C, and changes in LBM?

DESIGN

Subjects were selected by use of the Heath-Carter somatotype rating form[1] and then randomly assigned, and matched by pair to one of two treatment groups.

Subjects initially received sufficient calories to balance daily energy demands, plus an additional 500 kilocalories. Weight loss or gain of more than 2.2 kilograms per week dictated addition or deletion of calories. Subjects were fed ordinary table foods for breakfast and dinner; for lunch, they received a liquid supplement. The HIGH CHO diet contained 65% carbohydrate, 20% fat and 15% protein; the MOD CHO contained 40%, 45% and 15% respectively.

Both groups trained three days per week, using heavy weights, for nine weeks.

METHODS

Body composition tests were performed using the hydrostatic weighing method[2,3] Residual lung volumes were estimated by means of the nitrogen dilution method[4].

Blood for somatomedin-C was collected following a 12 hour fast, before the first treatment and after one, three, six, and nine weeks. The serum was frozen within four hours of collection, and stored at -20°C, until analysis by radioimmunoassay[5].

Statistical analyses included: two-tailed dependent t-tests, multiple analysis of variance, and linear regression analysis.

RESULTS

SM-C increased 26% in response to a 4.6% increase in both BWT and LBM. There was no significant difference between the two treatment groups with respect to BWT, LBM or SM-C ($p<0.05$).

The MOD CHO group, but not the HIGH CHO group, showed significant correlations across each time period for LBM vs. SM-C ($r^2 - 0.6098$ for week three, $r^2 - 0.8398$ for week six, and $r^2 - 0.7183$ for week nine).

CONCLUSIONS

SM-C appears to be a potential marker for changes in LBM for individuals on a typical American diet (MOD CHO diet).

Further studies, using a larger "N" may uncover a clear relationship between SM-C and gains in LBM. At present, SM-C appears to show greater promise as a marker for declines in LBM associated with negative nitrogen balance[6].

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WEEKLY INTERDISCIPLINARY PATIENT CARE ROUNDS

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PROBLEM

Increasing number of elderly patients with complex discharge planning needs.

METHOD

The Department of Nursing, in our 276 bed community hospital, initiated Interdisciplinary Rounds for the purpose of: (1) providing a mechanism for early identification of patients with complex needs, (2) facilitating the discharge planning process, (3) promoting interdisciplinary communication and teamwork, and (4) maximizing utilization of the professionals' time.

Rounds were initially established on one unit and refined, prior to incorporation on all Medical/Surgical units. Ten disciplines are represented at rounds on each unit on a weekly basis. After the process had been operational for several months, a Task Force was utilized to standardize format and clarify roles and goals.

Information pertaining to each patient on the unit is presented according to the criteria established by the Task Force. The process takes approximately 30 minutes. When complex issues are identified, a patient care conference is scheduled.

SUMMARY AND CONCLUSION

The outcomes of interdisciplinary rounds were analyzed by Nursing Quality Assurance for: (1) numbers of new cases identified, (2) types of patient problems, (3) ages and diagnoses of the patients referred, and (4) identification of the discipline(s) receiving the referral. Professional feedback has been very positive.

Interdisciplinary communication has been enhanced through the consistent opportunity to discuss patients and plan care, and compliance with fiscal regulations has been facilitated. Utilization of time is enhanced by the early identification of patient problems and need to repeat patient information only once.

We have found Interdisciplinary Rounds to be effective in enhancing the discharge planning process, decreasing the length of stay, and increasing patient and family satisfaction.

HEALTH RISK APPRAISAL

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INTRODUCTION

For several years, the Medical College of Georgia and the local chapter of the American Red Cross have co-sponsored a community Health Care Fair. These fairs have been held alternately at two large malls located in the greater Augusta area. The purpose of the fairs has been to provide general health appraisals to interested mall visitors at little or no cost, to promote good health, and to assist persons who need health care in obtaining it.

This paper describes a health fair station which focused on health risk appraisals. It was felt it would be helpful to provide an opportunity for mall visitors to examine their life styles, and to determine if there were areas of personal health behavior which they should continue or change in order to promote a more healthful life style.

PROCEDURE

Two types of self-assessments were utilized. The first was a group of paper and pencil inventories related to work interests, recreational interest, emotional well-being, stress, and a nutritional assessment for adults. These can all be quickly scored and results provided and discussed. The other type of appraisal involved the use of an interactive computer program, "Health Risk Appraisal", produced by the University of Minnesota. Both methods involved participants in a highly personalized question, answer, and feedback process; and in learning which behaviors could be changed to reduce health risks.

One hundred twenty-four people completed the computer-based Health Risk Appraisal during a Health Care Fair at the Augusta Mall. Each person received a printout including a list of possible causes of death in comparison to the average person of the same age, sex, and race; and appraised age based on the person's actual age and health risk; suggestions for reducing risks; and a new appraised age predicted if all suggestions were followed.

DATA ANALYSIS

Copies of all the printouts were retained. These were analyzed to determine age, sex, and race of the participants and their risks. The age categories were arranged in five-year intervals beginning at age ten and ending with 75 years and older. Health risks were categorized as below average, average, and above average (Table 1). Based on the distribution of the at-risk population, the sample was divided into four groups for further analysis: over and under forty years of age, and below average or average, and above average health risk. For each group a frequency analysis was compiled of the suggestions to decrease health risks. These were placed in rank order by individual and by the number of risk reduction points.

RESULTS

The age range was from twelve to 76 years of age, and the greatest percentage of participants were below forty years of age. Based on the population in this study, 43.55% were of below average health risk, 44.36% were of average health risk, and 12.09% were of above average health risk. The category at greatest risk was found to be white males over forty years of age. The category least at risk were white females below forty years of age. For persons over forty, the greatest health risks were high blood pressure, obesity, lack of regular exercise, smoking, and lack of yearly breast and rectal examination. For those under forty, the greatest health risks were high blood pressure, obesity, the use of drugs and alcohol, lack of regular exercise, and failure to regularly use seat belts.

DISCUSSION

The populaiton in this study is not representative of the population of the greater Autgusta area; however, it is representative of the people who shop at this Mall. The sample was heavily weighted toward white males.

In terms of reducing health risks, reducing blood pressure and weight, and exercising regularly were recommended for all categories. Other recommendations for those over forty years of age were to stop smoking, and to have yearly breast and rectal examinations. Other recommendations for those under forty years of age included stopping the use of drugs and alcohol, wearing a seat belt, and having yearly breast examinations.

SUMMARY

Results of this study show a need for health promotion programs as indicated by the finding that at least one out of ten people was at above average health risk. Allied health personnel should work with other groups to promote general programs that include an advocacy role, e.g., suggesting that shopping malls install machines to check blood pressure; developing promotional displays which may include posters concerning the use of seat belts; introducing leisure time activities which would help people lose weight and decrease or eliminate drug and alcohol intake; and promoting stress reduction and relaxation programs.

TABLE 1.

HEALTH RISK

	WHITE MALE			WHITE FEMALE			BLACK MALE			BLACK FEMALE			TOTAL			
AGE	Below Average	Average	Above Average	Below Average	Average	Above Average	Below Average	Average	Above Average	Below Average	Average	Above Average	Below Average	Average	Above Average	AGE
10-14				4						1			5			10-14
15-19	2	3	1	2	1					1			5	4	1	15-19
20-24	1	1		7	5					1	1		9	7		20-24
25-29		2		2	1	2	1						3	3	2	25-29
30-34	1	1	2	2	1					1	1		4	3	2	30-34
35-39	5	4		3	8								8	12		35-39
40-44	3	3		2	2						2		5	7		40-44
45-49	3	3	1	2	2				1				5	5	2	45-49
50-54	1		1		1		1	1				1	2	2	2	50-54
55-59	1	1	2		3	1	1						2	4	3	55-59
60-64	2		1	2									4		1	60-64
65-69	1		2		5								1	5	2	65-69
70-74		1			1									2		70-74
75 +	1				1								1	1		75 +
TOTALS	21	19	10	26	31	3	3	1	1	4	4	1	54	55	15	

Population = 124 people at the Augusta Mall, Augusta, Georgia

A STUDY OF BIOPROSTHETIC HEART VALVES RECOVERED FROM HUMANS

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The overall long-term objective of this project is to study alterations which occur in different types of cardiac valves made of biological tissue used in this country and abroad while implanted in either intra- or extra-cardiac positions in human patients. A comparison was made of structural and functional changes in porcine aortic valves and valves constructed of bovine pericardium (approved for use in the USA) and cadaveric dura mater (used in South America). The short-term goal of this phase of the investigation was to examine morphological, elemental and histochemical changes which occur in these connective tissue valves while implanted for varying periods of time.

Recovered and control valvular leaflets were processed and studied using light microscopy and transmission (TEM) and scanning electron microscopy (SEM), microprobe X-ray analysis, and histochemical techniques (elastin and collagen stains). After fixation TEM samples were post-fixed in 2% osmium tetroxide, dehydrated in an increasing ethanol series and left overnight in a 50/50 propylene oxide/epon 812 mixture. The samples were then embedded in pure epon 812, sectioned, stained with lead citrate and uranyl acetate and photographed in a Philips 300 electron microscope at 80 kV. SEM specimens were fixed with 0.144N sodium cacodylate buffered 3% glutaraldehyde solution and dehydrated in an increasing ethanol series. After being dried in a Critical Point drying apparatus, the samples were examined and photographed at 15-25 kV in a Cambridge Stereoscan S-180 scanning electron microscope. After Critical Point Drying, X-ray microanalysis samples were mounted on carbon stubs with a carbon paste and coated with 30 nanometers of carbon in a Denton Vacuum DV502 evaporator. Specimens were then analyzed in a Cambridge Stereoscan S-180 scanning electron microscope equipped with an EDAX energy dispersive X-ray unit and a Nova 2 lab computer.

Surface cells (endothelia cells, blood cells and macrophages) were more numerous and better organized on porcine aortic cusps than on the other two biological valve types. Calcification was most prominent on and within dura mater valvular leaflets, while porcine aortic valves demonstrated fewer calcific nodules in scanning electron microscopy and less evidence of calcification with microprobe X-ray analysis. Least calcification was observed in each of these valve types when implanted in conduits in the extracardiac position. Neointima (peel) was found, however, only in valved conduits, and this material was usually covered by flattened endothelial cells. Neointima was observed in the left outflow tract, but it was thicker and often obstructive in the right outflow tract. Each valve type revealed a different wearing pattern based upon its implantation site either within the heart or in an extra-cardiac position.

For a cardiac valvular implant to be accepted and to function adequately, significant structural and physiological changes must occur within the valve after implantation. The significance of this research lies in the fact that new information related to these specific changes (nature and pattern of calcification, connective tissue remodeling, cellular changes, endocardial overgrowth, etc.) and to transplantation in general have been provided by this interinstitutional/international collaborative approach to the problem. Likewise, the methodology and overall success of this specific implantation techique can only be improved with this understanding of the dynamic alterations that serve to transform pieces of dura mater and bovine pericardium and porcine aortic heterograft valves into competent heart valves for humans.

RELIABILITY OF ISOKINETIC ENDURANCE TESTS

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BACKGROUND

To promote clinical research by clinician members of the Southwestern District of the Pennsylvania Physical Therapy Association, this study was designed to involve several clinicians in a variety of practice settings in the data collection phase of a research project. The intent of involving clinicians in a designed research project was to decrease the fear of doing research and reduce the complexity for the clinician of setting up the project. Given a "model" research project, clinicians may be more likely to initiate a clinical research project independently in the future. The participation of several clinicians in the district in data collection provided a mechanism to conduct a more extensive study in a shorter period of time. The demonstration collaborative study may also help establish a network of area clinicians interested in future cooperative research ventures.

INTRODUCTION

The Cybex II isokinetic device can be used to obtain the relative endurance of a muscle group. However, the reliability of measuring relative endurance has not been documented. This study was done to compare the reliabilities of two methods of measuring relative muscle endurance at two speeds using the Cybex II: 1) work endurance ratio (WR), which is the ratio of the work done during the last five of 25 maximum contractions to work during the first five, and 2) the number of contractions (NC) until peak torque falls below 50% of the initial peak torque.

METHODS

The dominant knee of 36 subjects with no lower extremity pathology was tested twice at 180 degrees/sec and twice at 240 degrees/sec, with only one test per day and at least two days between tests. The standard Cybex II protocol for determining WR was followed, except that additional contractions were done, if necessary, to determine NC. Test-retest Pearson product-moment correlation coefficients (r) and Interclass Correlation Coeffiecients (IC C) were calculated for various measurements obtained from the Cybex, including WR and NC (see tables).

RESULTS

TEST-RETEST CORRELATION COEFFICIENTS

	Extensors				Flexors			
Measurement	180 deg/sec		240 deg/sec		180 deg/sec		240 deg/sec	
	r	ICC	r	ICC	r	ICC	r	ICC
Peak Torque	.93	.93	.95	.95	.84	.81	.71	.66
Torque Acceleration Energy	.62	.57	.88	.88	.85	.83	.76	.76
Total Work	.98	.98	.87	.84	.91	.91	.83	.83
Work (Reps 1-5)	.95	.95	.95	.95	.87	.85	.81	.78
Work (Reps 21-25)	.95	.95	.86	.81	.77	.75	.84	.84
Average Power	.97	.97	.74	.74	.91	.91	.84	.83
W R	.48	.48	.56	.56	.60	.60	.81	.73
N C	.85	.85	.74	.71				

DISCUSSION

Peak torque and absolute work were generally more reliable measurements than relative endurance as measured by WR or NC. WR during flexion was more reliable than during extension. NC was not determined during flexion, but during extension NC was much more reliable than WR.

CONCLUSIONS

These findings indicate that WR may not be a very reliable measurement of muscle endurance, and that a better measurement of muscle endurance using the Cybex II may be NC.

ADDENDUM

This Study was supported by a research grant from Gatti Medical of Indiana, Pennsylvania, to the Research Committee of the Southwest District of the Pennsylvania Chapter of the American Physical Therapy Association.

FUNCTIONAL CAPACITY OF PATIENTS PRIOR TO AND AFTER BONE MARROW TRANSPLANT

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ABSTRACT

The state of the cardiovascular system in patients with cardiovascular disease and end-stage renal failure prior to transplant appears to be important in determining functional capacity and may limit rehabilitation (Painter, 1985). Patients with a diagnosis of leukemia undergoing bone marrow transplant may also be limited by their pre-transplant functional capacity (Pfalzer, 1986). The response of patients with leukemia prior to and post-transplant to acute or chronic exercise to improve functional capacity has not been reported. Low level exercise post transplant is routinely performed to prevent symptoms of debilitation from restricted living space and diminished activity. The purpose of this research on the effects of interval bicycle ergometry training on patients diagnosed as having Acute Lymphocytic Leukemia, Acute Non-lymphocytic Leukemia, Chronic Myelogenous Leukemia and Aplastic Anemia undergoing bone marrow transplant was two-fold: 1) to examine if differences existed post-transplant in these subjects between and early intervention exercise protocol and a latter intervention exercise protocol; and 2) to examine post-transplant if the perceptions these subjects had of symptoms limiting activity changed with aerobic training. Testing was performed in the early and late intervention groups pre-transplant, upon descharge onto the outpatient day care unit, and near one hundred days post-transplant. Assessment included: a) monitoring of heart rate via 12-lead EKG, blood pressure, oxygen consumption and perceived exertion during symptom-limited maximal graded exercise testing (SLGXT); b) isokinetic muscle strength evaluation at 90, 180, and 300 degrees per second; and c) selected psychological parameters measured. The SLGXT was discontinued when patients reported symptoms of leg fatigue, shortness of breath, or excessive overall fatigue. Testing was also stopped if any of the criteria from the American College of Sports Medicine Guidelines For Test Termination were met. The exercise tests were completed by all subjects at pre-transplant assessment, on discharge to the day care unit and near one hundred days post transplant. The majority of subjects terminated the test due to leg fatigue. Twenty-three patients post bone marrow transplant began training three days a week, either: 1) a few days post-transplant through one hundred days post-transplant (early intervention group, n=9), or 2) approximately thirty days post-transplant upon discharge from the inpatient unit onto the outpatient day care unit through one hundred days post-transplant (late intervention group, n=7). Pre-test peak VO2 values were below values reported for sedentary normals. The early and late intervention groups showed significant improvement in functional capacity as measured by increased peak oxygen consumption and improved lower extremity muscle strength post training. At the same submaximal workloads post training there was diminished heart rate, blood pressure, and ratings of perceived exertion. The subjects' VO2s approached normal sedentary values post training. This investigation was supported in part by PHS grant number 5R01NU1078-02 awarded by the National Institutes of Health, Nuring Division, DHHS.

INTRODUCTION

Bone Marrow Transplantation (BMT), a relatively new medical technique in the treatment of patients with leukemia, has become an important innovative therapy for such diseases. The disease and procedures required for transplant and prevention of rejection: chemotherapy, protective isolation housing, immunosupressive drugs and the side effects, take their toll on this young cancer population. In 1984, the cure rate in cancer with treatment had increased to fifty per cent with three hundred thousand patients returning to the community annually. New technologies like BMT will rapidly increase the cure rate.

> "The contribution of physical exercise, or physical therapy to the rehabilitation process from disease states and the impact of a conditioned state on resistance to disease are important issues. In particular, the contribution of an exercise program to rehabilitation from cancer is unknown (Deuster et al, 1985)."

Rehabilitation status or exercise capacity of patients after bone marrow transplant (BMT) has not been reported. The exercise capacity of recipients of renal transplants on anti-rejection agents, prednisone and cyclosporine-A, has been reported (Painter et al, 1985). These same anti-rejection agents are used for patients who receive bone marrow transplants. The state of the cardiovascular system in cardiac and end-stage renal disease patients prior to transplant appears to be important in determining functional capacity and may be the limiting factor in rehabilitation. Exercise capacity has been reported for various persons with anemias and may be similiar to the peak oxygen uptake in leukemia patients prior to undergoing BMT (Woodson et al, 1978; Alpert et al, 1984; Charache et al, 1983); however, objective measures have not been reported. The purpose of this study was two-fold: 1) determine if patients after BMT could improve their functional capacity as a result of participation in a low to moderate level aerobic exercise interval training program, and to compare the difference in functional capacity as a result of early versus late intervention; and 2) determine if aerobic exercise reduces disease and treatment-related symptoms and perceptions of symptoms which limit activity.

METHODS

Subjects

Twenty-three patients with a diagnosis of leukemia admitted to the BMT Unit at The Ohio State University Hospital volunteered to participate in this study. Loss of eight subjects occurred due to relapse and infection. Height, weight, ages, and select skinfolds to determine per cent body fat were recorded prior to the exercise test (Table I). Testing for this study was conducted prior to onset of chemotherapy for the transplant procedure. The transplant protocol at The Ohio State University Hospital does not include total body irradiation. Subjects with known histories of cardiac disease, hypertension, and diabetes mellitus or those currently on cardio-toxic drugs were not included in this study. An informed consent was obtained from all subjects according to the guidelines of the University Human Subjects Committee.

TABLE I. Physical and Clinical Characteristics of Paients Pre and Post Transplant Compared to Reported Values for Patients with Amemias and Renal Transplant.

	PRE (n=23)	POST (n=16)	RENAL* TRANS (n=8)	SICKLE* CELL (n=8)	SICKLE* CELL (n=51)	NORMAL* INDUCED (n=11)
AGE (years)	30.4+6.8		34+7.0	24.6 (18-29)	10.3 (5-18)	 (20-27)
HT (cm)	174.5+10.5		171+10			
WT (kg)	69.4+13.9	62.6+8.8	74+22	58.95		
HB (mg/dl)	11.9+1.8	10.1+ .9		8.5	8.2	10.0 +1.2
HCT	31.5+3.7	28.3+4.6	45.1+4.1		25.0	
BUN (mg/dl)	19.+5.1	26.+9.3			20.7+8.2	
SERUM CREAT (mg/dl)	1.1+.3	1.3+.2			1.4+0.4	

*Reported values from: Painter et al, 1985; Charache et al, 1983; Alpert et al, 1984; and Woodson et al, 1978.

Exercise Testing

Symptom-limited maximal graded exercise testing was performed on the subjects prior to transplant, on discharge to the out-patient day care unit and near one hundred days post-transplant on a Monark #868 cycle ergometer. The resistance was initially set at zero load and was increased one-half kilogram every two minutes, with the speed held constant at fifty revolutions per minute by a Franz electric metronome. All subjects continued to exercise until symptoms of leg fatigue, shortness of breath, or excessive fatigue prevented continuation. Ratings of Perceived Exertion (RPE) were determined every two minutes prior to increasing workload, and at exercise cessation (Borg, 1974). In addition, the test was discontinued if any of the criteria listed in the American College of Sports Medicine Guidelines for terminating a graded exercise test were met (ACSM, 1986).

Expired air was collected through a one-way valve attached to head gear and face mask. Volumes and fractions of CO2 and O2 were analyzed by the Erich Jaeger Ergo-Pneumo Test II Metabolic Cart. Oxygen uptake (VO2) was calculated in l/min and ml/kg/min correcting for body weight. Peak VO2 was the highest VO2 achieved during the test.

A 12-lead EKG was monitored continuously during the test on a Computer Assisted System for Exercise (CASE) Marquette EKG unit. Blood pressure was monitored every two minutes by ascultation and responses were evaluated according to the pattern of elevation. The test was discontinued when systolic pressure decreased with increasing workload, systolic pressure rose above 250 mm Hg, or diastolic pressure rose or dropped more than 20 mm Hg.

STATISTICAL ANALYSIS

Pre- and post-test data on peak VO2, maximal heart rate, blood pressure, and RPE were examined for significant differences by paired t-test (See Table I).

RESULTS

Physical and clinical characteristics of subjects prior to and after BMT are shown in Table I, as compared to reported values for patients with a diagnosis of anemia and after renal transplant. The mean cumulative dosages of prednisone and cyclosporine-A were 2,608 - 523 mg. and 44,312 - 6,854 mg., respectively, from pre- to post-testing. Symptom-limited maximal graded exercise tests were successfully completed by all subjects prior to and after transplant, with the most common reason for terminating the test being leg fatigue. RPE at pre- and post-test termination were 19.2 + .5 and 18.4 + 1.3, respectively.

The peak oxygen uptakes are compared to reported values for patients with renal transplants and anemia in Table II. For all subjects, resting blood pressures were below hypertensive levels (>140/90 mm Hg), exercise systolic values were below >250 mm Hg, and systolic pressure rose as workload increased for both pre- and post-tests. Subjects after transplant had diminished functional capacity when compared to persons of similiar age and sex. Subjects in both the early and late exercise intervention groups improved their muscle strength and functional capacity, as measured by isokinetic strength evaluation and peak oxygen consumption on symptom-limited graded exercise testing.

TABLE II

Exercise Test Results

	PRE	POST	RENAL* TRANS	SICKLE* CELL	SICKLE* CELL	NORMAL* INDUCED
					(kg-m/min)	
WORK PERFORMED					368	
MAX VO2 (l/min)	107+.57	100±.40	2.3+0.6			
MAX VO2 (ml/kg/min)	18.6+7.7	141±4.7	31.7+7.0			30.7
MAX HR (bpm)	165±29	147±27	171+16	162	185	183
MAX BP (mm Hg)	150+33	167+30	188+21		142	
MAX RPE	19.3+1.1	18.7±1.4				
VE (ml/min/kg)	897	602	859			1,237

*Reported values from: Painter et al, 1985; Charache et al, 1983; Alpert et al, 1984; and Woodson et al, 1978.

DISCUSSION

Results of the study indicate peak VO2 in patients prior to and one hundred days after bone marrow transplant are markedly lower than VO2 max reported for sedentary, healthy individuals. Similiar values, however, have been reported for patients diagnosed with anemia and after renal transplant. The improvement in peak VO2 after transplant may be due to the diminished anemia (Hb, Hct, RBC increased after transplant). Anemia limits exercise capacity by decreasing oxygen (O2) transport to working muscle with resultant hypoxia (Charache, 1983). An improvement in the anemia allows a reduction of left ventricular workload (decreased heart rate at same cardiac output) through imporved O2 transport (Woodson,1978; Alpert,1984). Higher maximal heart rates were attained after transplant, which may have also contributed to increased cardiac output and improved O2 transport.

A factor contributing to the low peak VO2 is the diminished muscle mass after transplant. The effect of high-dose steroids and cyclosporine-A, anti-rejection drugs, on exercise capacity is unknown; although, it is thought to limit performance (Painter,1985).

It is also possible, the early onset of anaerobic metabolism in patients with anemia, or on high-dose prednisone limits the exercise capacity secondary to acidosis (Nakoa, 1982). The high RPE at low peak VO2 values with many subjects ceasing to exercise due to leg fatigue suggests metabolic acidosis may be a limiting factor of exercise capacity (Allen, 1977; Kostka, 1982).

In summary, the diminished exercise capacity of subjects undergoing BMT indicates these persons may benefit from an appropriate exercise training program to improve physical fitness. The low peak VO2 values prior to and after transplant appear to be important in determining functional capacity and may be the limiting factor in early rehabilitation of these patients.

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MEASUREMENT OF OXIDATION REDUCTION POTENTIAL AND CONDUCTIVITY OF HUMAM LYMPHOCYTES FOLLOWING BINDING BY ANTIBODY

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ABSTRACT

The purpose of this study was to measure electrochemical changes that occur when antibody binds to lymphocytes. In theory, the binding of antibody to HLA antigens embedded in the lymphocyte membrane would alter the transmembrane potential by causing structural changes associated with release of reductants and oxidants into the culture medium. These changes could be detected by redox and conductivity electrodes, and may provide a means of quantitating the binding of antibody to HLA antigen.

A mouse monoclonal IgG2a immunoglobulin which binds to a monomorphic determinant serologically defined as HLA-ABC-ml was incubated with human lymphocytes and rabbit complement and changes in redox potential and conductivity were compared to a control of the lymphocytes, normal serum, and complement. The anti-HLA killed at least 90% of donor lymphocytes in every trial as determined by Terasaki microcytotoxicity assay. The mean potential after combination with this antibody was +224.5 mV compared to +164.1 mV (N-26) for the normal serum controls. The redox potential drop before and after the addition of complement was greater for anti-HLA than for the control group in 100% of trials. The conductance after incubation with complement averaged 0.68 mMho higher in the test group, and was higher in 100% of trials.

Results indicate that binding of monoclonal antibody to HLA antigen on human lymphocytes is associated with production of less reductant and higher conductance than occurs when normal serum and complement are incubated with the same cells. Electrochemical changes associated with binding of anti-HLA are measurable, and may be useful in detecting antibody-antigen reactions on lymphocytes.

INTRODUCTION

Histocompatibility testing is the primary means used to predict allograft survival. Current practice for determining donor organ compatibility requires matching of the ABO blood group, class I human lymphocyte antigens (HLA-A, HLA-B, HLA-C and HLA-DR loci) and class II antigens (HLA-D locus). Class I antigens on donor and recipient lumphocytes are defined serologically, and class II antigens are defined by the mixed lymphocyte reaction (MLR). The latter test correlates with the recipient's ability to recognize the allograft immunologically, while the HLA gene products are targets of cytotoxic lymphocytes and antibodies that mediate allograft rejection.

Terasaki[1] described a microcytotoxicity assay that is most often used to determine the HLA phenotype. Lymphocytes are mixed with a panel of antisera and complement and the cells are positive for corresponding antigens if a significant percentage are killed. Cell death is measured as the percentage of lymphocytes which take up a supravital stain such as eosin or trypan blue. A major limitation of microcytotoxicity testing is a high incidence of equivocal results occurring when antisera cross react with related antigens, and when antibody and complement binding is not sufficient to kill the cells[2].

The purpose of this research is to measure electrochemical changes that occur when pancytotoxic antibody binds to human lymphocytes. Conformational changes occur within target cells when antibody and complement bind to the cytoplasmic membrane[3]. These changes alter the distribution of intracellular and extracellular electrolyte[4]. This study will determine whether a measurable change occurs in the oxidation-reduction (redox) potential and electrical conductivity of human peripheral blood lymphocytes following in vitro binding of anti-HLA and complement.

The redox potential of a suspension of lymphocytes is determined by the membrane potential of the cells, the diffusion potential of the medium, and the reduction potential of the antiserum and complement. The latter two are unchanging when the same lot of antiserum and complement are used, and diffusion potential is zero when the surface charge density of the cells is high. The redox potential of the cell suspension is characterized by the Nernst equation in the form, $E = E^o + RT/nF \ Ln \ [ox]/[Red]$, where E^o is the standard potential, defined as the electron pressure when oxidant and reductant are present at a concentration of 1.0M at 25° C and pH 7.0; R is the molar gas constant; T is absolute temperature; F is the Faraday constant; and n is the number of electrons transferred per reduction. The measured potential, E, will vary with changes in the ratio of reductant and oxidant, and the difference between initial potential, E_i, (after antibody has equilibrated with cells) and final potential, E_f, (after complement has incubated with cells) is a function of the rate of change in the relative concentration of reductant to oxidant. In theory, the binding of antibodies and complement to the antigens in the lymphocyte membrane will alter the membrane potential and ratio of reductant to oxidant. This would result in a significant difference in E (E_i-E_f) when tests are compared to controls using normal human serum in place of antiserum.

Alteration of redox potential may be associated with a significant change in the conductivity, u, of the cell suspension. Conductivity is determined by the capacity of the medium to carry electrons. It is dependent upon ionic strength, and is influenced by diffusion of charged moieties into and out of the cells. Conductivity is expressed by the formula, $u = \frac{KA}{d}$, where K is the specific conductance, A is the surface area of the electrodes, and d is the distance between electrodes.

A change in redox potential caused by cytotoxic antibodies binding to lymphocytes may be accompanied by a change in diffusion potential that affects the conductivity. The conductivity of the cell suspension after binding of antibodies and complement, u_f, may be significant when compared to negative controls.

Quantitative measurement of redox potential and conductivity will be correlated to microcytotoxicity by determining the percentage of cells killed by antibody and complement. A significant difference in redox potential or conductivity between tests and negative controls would indicate that electrochemical measurements could be used to detect and possibly quantitate the binding of antibodies. Subsequent experiments using panels of monospecific anti-HLA would determine whether electrochemical measurements could be used to determine HLA phenotypes.

MATERIALS AND METHODS

Preparation of Mononuclear Cells

Twenty millitliters of venous blood was collected from volunteers in vacutainer tubes containing 143 units of lithium heparin (Becton Dickinson, Rugherford, NJ). Mononuclear cells were separated by gradient density centrifugation using Ficoll-sodium diatrizoate (Pharmacia Fine Chemicals, Pescataway, NJ) according to the method of Boyum[5].

Red blood cells were removed by hypotonic lysis using sterile water, and cells were washed three times in Hank's balanced salt solution (GIBCO Laboratories, Grand Island, NY) to remove platelets. After the final wash, the cell pellet was resuspended in 2.0 mL of RPMI-HEPES (GIBCO, Grand Island, NY), and the leukocyte count determined using a Coulter Model F (Coulter Electronics, Hialeah, FL). The cell count was adjusted to 2 X 10^6/mL and 2,000 units of Penn-Strep (GIBCO, Grand Island, NY) was added to each 3.0 mL of cell suspension. Cells were examined under 500X magnification using 0.4% w/v trypan blue dye in 0.85% w/v saline (GIBCO, Grand Island, NY). Cell suspensions giving viability counts below 90% were not used.

Microcytoxicity Assay

Assays were performed by a modification of the Terasaki method. The antiserum used was a monoclonal anti-HLA-ABC (Australian Monoclonal Development, Artarmon, Australia). This antibody is an Ig G2a, and is reactive to a monomorphic HLA deter-minant of the HLA-B2M complex present on all human mononuclear leukocytes. The initial antibody concentration was 1.0 mG/mL. Serial dilutions of anti-HLA were checkerboard titrated against rabbit complement (Cedarlane Laboratories, Ontario, Canada) in order to determine optimal working titers of anti-HLA and complement. Working dilutions of 1:100 for anti-HLA and 1:4 for complement were used for all assays (except for comparison of anti-HLA volume to percent kill). These dilutions resulted in a 95% kill of normal lymphocytes when cells were incubated for 30 minutes at 20° C with anti-HLA followed by 60 minutes of incubation at 20° C after addition of complement.

All cytotoxicity, redox and conductivity tests were performed using the same lot and dilution of anti-HLA and complement. Microcytoxicity tests were performed by mixing 50 uL of antisera and 50 uL of 2×10^{6}/mL mononuclear cells. 100 uL of working complement was added after 30 minutes of incubation at 20° C, and incubation was continued for an additional 60 minutes. Cells were stained with 0.4% trypan blue, and 100 mononuclear cells were counted under 500X magnification in order to determine the percent kill.

Measurement of Redox Potential

Cells were prepared as described above, and were mixed with anti-HLA and complement in the same proportions as for microcytotoxicity. Redox potential of the mixture of anti-HLA and mononuclear cells was measured after 30 minutes of incubation at 20° C (E_i). Complement was added and the mixture incubated for an additional 60 minutes before a second redox measurement (E_f). The procedure was repeated for the negative control which was performed in exactly the same manner except that pooled normal serum was substituted for anti-HLA. A platinum electrode and Ag/AgCl reference half cell (Orion Research, Cambridge, MA) were used to measure electron pressure. Potential was measured to the nearest 0.01 mV using a Fisher MP25 ion selective meter (Fisher Scientific, Pittsburgh, PA).

Stability of the antiserum was determined by timed redox measurements of serial dilutions of anti-HLA using the redox apparatus described above. These measurements served as a baseline potential of the antiserum in the absence of cells.

Comparison of Percent Kill to Redox Potential

Dilutions of anti-HLA beginning at 1:200 were prepared using RPMI-HEPES, and these were tested for microcytoxicity and redox potential as described above.

Measurement of Conductivity

Mononuclear cells were prepared as described previously, and were mixed with anti-HLA and complement in the same proportions as described for measurement of microcytotoxicity and redox potential. Conductivity was measured using a platinum conductivity cell with a cell constant, K, of 1.0/cM (Yellow Springs Instruments, Yellow Springs, OH). Conductivity was measured once, after 60 minutes of incubation following the addition of complement. Measurements were made at 20° C (without temperature compensation) to the nearest 0.01 mMho using a YSI model 32 conductivity meter (Yellow Springs Instruments, Yellow Springs, OH).

RESULTS

Lymphocytes from 26 donors were tested against monomorphic anti-HLA-ABC by the microcytotoxicity assay. Results of microcytotoxicity, redox potential and conductivity are presented in Table 1. The microcytotoxicity test was positive for all of the cells tested, giving >90% kill in all trials. The monoclonal anti-HLA is cytotoxic for all human blood leukocytes, and cross reacts extensively with mouse mononuclear cells. The antibody does not react with human red blood cells; however, red cells are not useful as a negative cell control, since they exhibit a different surface charge than white cells, and are present in small numbers in all mononuclear cell preparations.

Table 1

Summary of Results for Microcytotoxicity, Redox Potential and Conductivity of Human Lymphocytes Following Binding of Monoclonal Anti-HLA

	Microcytotoxicity	Redox Potential			Conductivity
	$\bar{x}$ Kill in % N=26	$\bar{x}$ E_i mV	$\bar{x}$ E_f mV N=26	ΔE mV	$\bar{x}$ u_f mho/cM *N=21
Test	96.4% (Sd 2.53)	224.5 mV (Sd 31.60)	133.5 mV (Sd 20.01)	91.0 mV (Sd 19.96)	13.0mMho/cM (Sd 0.45)
Neg Control	2.3% (Sd 2.41)	164.1 mV (Sd 19.55)	120.0 mV (Sd 20.58)	44.2 mV (Sd 10.56)	12.4mMho/cM (Sd 0.41)

*Five test gave insufficient cells for the conductivity test
Standard deviation, Sd, is shown in parenthesis.

Cells were tested for redox potential and the ΔE (E_i-E_f) was compared to a negative control. The initial potential was always positive and the final potential always less positive for both test and controls. The Δ E was greater for the test than control

Figure 1
% KILL vs POTENTIAL (E_f)

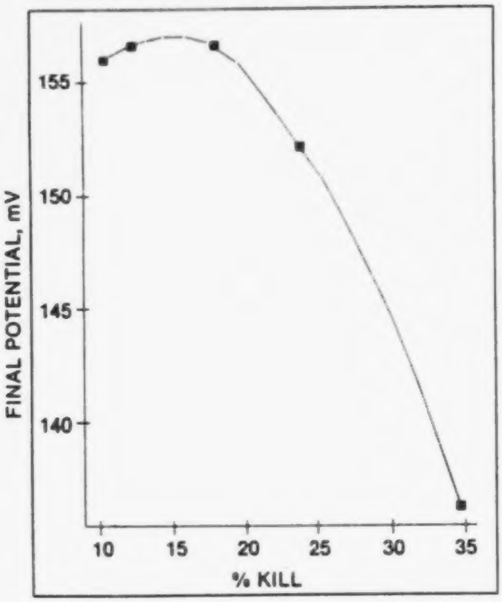


Figure 2
ANTI-HLA vs. POTENTIAL (E_f)

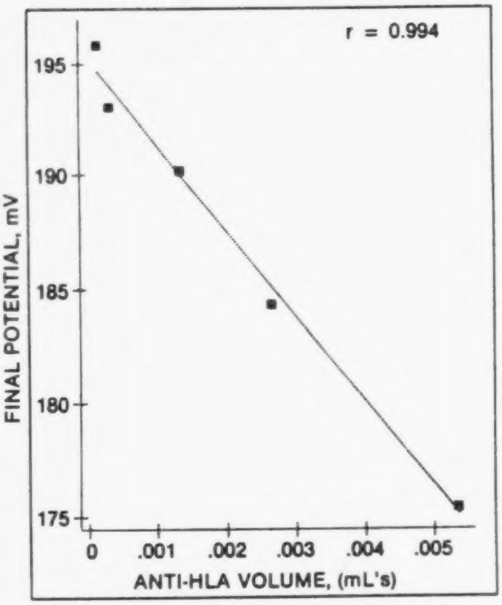


Figure 3
BLANK ANTI-HLA vs POTENTIAL (NO CELLS)

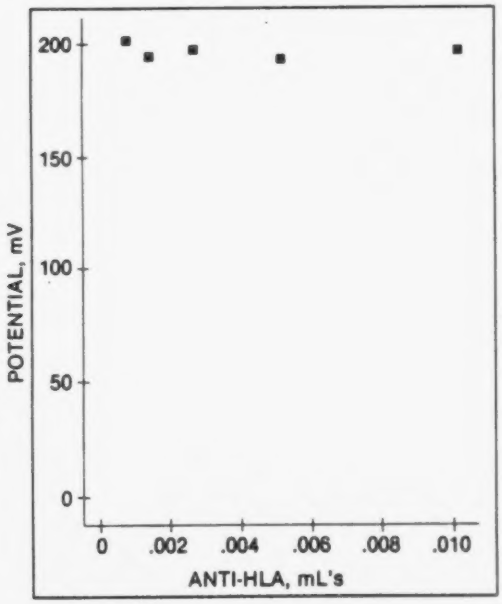
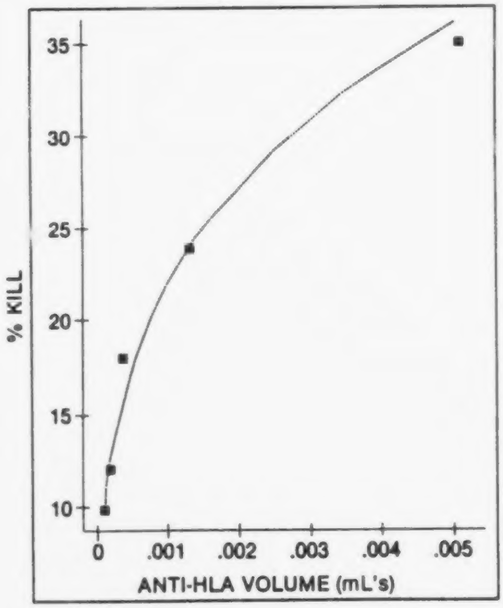


Figure 4
ANTI-HLA vs % KILL



in 100% of trials. The mean ΔE for the test was 91.0 mV compared to 44.2 mV for negative controls. A paired student's test of means was highly significant ($t=11.22$, $p<0.0001$).

Dilutions of anti-HLA were prepared from 1:200 to 1:12,800. These were mixed with normal mononuclear cells and complement, and percent kill and redox potential were measured. Figure 1 shows the plot of % kill versus E_f. The plot is curvilinear and has a negative slope. A plot of anti-HLA volume versus redox potential is shown in Figure 2. This curve is linear and fits the equation $y = 196.4 - 4.28 \times 10^3 x$, where x is expressed as the volume of the anti-HLA in milliliters. Since redox potential varied inversely with dilution, it was necessary to determine if dilution of cell free anti-HLA (blank) would produce the same slope. A plot of blank versus redox potential is shown in Figure 3, and exhibits a slope approaching zero. A plot of anti-HLA versus % kill is presented in Figure 4; it is curvilinear and fits the equation $\text{Log } y = \text{Log } a + bx$

The mean conductivity of the tests following incubation with complement was 13.0 mMho/cM. The mean conductivity of negative controls following incubation with complement was 12.35 mMho/cM. Blank conductivity measurements (using RPMI-HEPES in place of cells) gave 11.48 mMho/cM for anti-HLA and 11.67 mMho/cM for normal serum. A paired student's test for means gave 6.62 which was highly significant ($p<0.0001$).

DISCUSSION

In all 26 trials, the ΔE was greater for tests than negative controls. The greater magnitude of change seen in tests was accompanied by higher conductivity after complement than for controls. The results indicate that measurable electrochemical events occur after binding of antibody and complement to human mononuclear cells. The initial potential of cell suspensions is positive in the presence or absence of anti-HLA. The cell suspensions begin with a greater concentration of oxidant than reductant but the ratio falls when complement is added. This could be caused by reduction of complement or antibody molecules; movement of oxidant into cells or reductant out of cells; conformational changes in the cells caused by binding of antibody and complement which alter the transmembrane potential; or reduction of thiols and other biomolecules. Since conductivity increases, it is likely that the mechanism involves production of reductant rather than a shift in the equilibrium of reduced and oxidized species.

Dilution of anti-HLA produced a sharp decrease in percent kill at dilutions above 1:500 (0.002 mL anti-HLA). This was accompanied by a rise in E_f, indicating that redox potential is inversely related to the extent of cell destruction.

A major disadvantage of the monomorphic anti-HLA is that it reacts with all human leukocytes; this obviates the use of a negative cell control. The antiserum and cells used for any HLA phenotyping introduce two independent redox variables, since different seras and cells produce different potentials. Therefore, reactions of an antiserum to both positive and negative cells are necessary in order to establish positive and negative ranges for potential measurements.

The monoclonal anti-HLA used in this study contains a homogenous population of antibody molecules with the identical affinity for antigen. Since the antigen is monomorphic, the density of bound ligand in the lymphocyte membrane would be much greater than for monospecific anti-HLA. The extent of membrane damage may be far greater in these trials than would be produced by conventional HLA typing sera. The changes in E and conductivity produced by HLA typing sera would be of lesser magnitude, and studies using conventional sera are required in order to determine if a redox potential or conductivity measurement would be useful in determining HLA phenotype.

The results of this study suggest that measurable electrochemical changes are associated with binding of antibody and complement to mononuclear cells. These changes may be used to confirm that attachment of antibody to cells has occurred.

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EPILOGUE: CONTINUED PLANNING FOR COLLABORATIVE RESEARCH

John R. Snyder, Ph.D.
Chairman, Research Symposium Planning Committee
School of Allied Medical Professions
The Ohio State University
Columbus, Ohio 43210

It is indeed gratifying to note that at the time of the 1986 Collaborative Research Symposium a total of 15 colleges and school of allied health at universities in six states have agreed to work together in a voluntary consortium to facilitate collaborative research in allied health. The purpose, structure and processes regarding the Collaborative Research in Allied Health Consortium are appended as part of this report. Although the Consortium was formed in the Spring of 1986, a number of collaborative activities have already begun between various member institutions in the Consortium. These activities include planning for collaborative research of both a funded and non-funded nature. While there has yet to be an externally funded collaborative research project as a result of the Consortium's efforts, proposal activities continue in this vein.

At the meeting of the Collaborative Research in Allied Health Consortium which followed the Symposium, two new exciting ventures were discussed. First, under the leadership of Dr. George Van Son (Ithaca College), efforts are underway to facilitate sharing of research ideas and opportunities via electronic networking. Dr. Van Son distributed a questionnaire to determine the interest of various institutions in subscribing to a microcomputer network for enhanced communication. It is hoped that a number of institutions will be able to communicate via this medium before the third Collaborative Research Symposium in September, 1987.

The second major discussion centered on planning for a workshop entitled "Developing Collaborative Research". It was suggested that Dr. Barbara Hansen, Vice Chancellor for Graduate Studies and Research at the University of Maryland be invited to serve as the speaker for this workshop. Dr. Hansen served as the keynote speaker for the first Collaborative Research in Allied Health Symposium in 1985. The purpose of the workshop would be two-fold: 1) to describe the process, benefits, and the pitfalls of collaborative research; and 2) to bring together principle investigators, co-investigators and research collaborators to plan interinstitutional and/or interdisciplinary research. The specific goal of the workshop would be that each attendee have an opportunity to become an active participant in a collaborative research project. The workshop should be designed as appropriate for both principle investigators seeking research collaborators and researchers interested in joining others on a collaborative study. The School of Allied Medical Professions at The Ohio State University has received partial funding for the offering of such a workshop. The date of the Developing Collaborative Research Workshop would be dependent upon Dr. Hansen's availability. The workshop would likely be hosted at The Ohio State University.

There was also some discussion about the potential for rotating the Symposium to different sites amongst the Consortium. There was general agreement that the Columbus site remain the most central location geographically, and that the processes for hosting the Symposium were in place and functioned effectively. It was noted, however, that there may be an opportunity in the future for other institutions in the Consortium to host the Autumn Symposium.

APPENDIXES

A. Survey of Research Interests of Faculty

B. Faculty Questionnaire on Research

C. Survey of Faculty Research Interests

D. Agenda: Meeting of the Collaborative Research in Allied Health Consortium

COVER SHEET

SURVEY OF RESEARCH INTERESTS OF FACULTY

When George Van Son recently delivered a paper at Ohio State University, he obtained permission to use and modify a questionnaire designed by M. Rosita Schiller, Ph.D., R.D., that she used to survey the research interests of dietitians.

He showed the questionnaire to me, and we both became intrigued with the idea of conducting an informal study of the research interests and skills of the faculty in the School of Allied Health Professions, with the ultimate objective of sharing the results with the faculty. If this preliminary study is successful, we would like to extend the sample to include faculty in other Schools in disciplines with some relationship to allied health (e.g., psychology, health education, etc.) These results, too, would be shared.

We believe that it would be of benefit to all of us to better understand how involved we are as a faculty in research, what research skills we believe we possess, and what skills we would like to improve. We hope the results will provide all of us with an additional focus for communication amongst the faculty about research interests, for planning for development and improvement of research skills, and for providing a basis of mutual support among the faculty in the School.

We would be very grateful if you would complete the attached questionnaire and return it to George or me by October 31, 1985. In order to allow us to follow up our response, but still maintain confidentiality, it would be most helpful if you would complete this cover sheet, detach it from the questionnaire, and return it to us under separate cover.

Although I tend to procrastinate, George doesn't, so we should be getting results back to you in November.

Thank you!

Susan Pritchard Bailey
George Van Son

Name ______________________________

Professional discipline ______________________________________

Professional association(s) ____

____

____

Full time _____ Part time _____

Academic rank:
_________ Instructor
_________ Assistant Professor
_________ Associate Professor
_________ Professor
_________ Professional Staff

Tenure status:
_________ Tenured
_________ Tenure-eligible, not tenured
_________ Not tenure-eligible

QUESTIONNAIRE

SURVEY OF RESEARCH INTERESTS OF FACULTY

Please note instructions provided for answering certain questions.

RESEARCH PREPARATION AND SKILLS

1. Do you see yourself as having the interest and skills to: (check all that apply)

_____ serve as an organizer and take responsibility for proposal writing and implementation?

_____ serve as co-investigator, help design studies and assist with proposal writing?

_____ collect data as requested by other investigators?

2. What are your research interests? (check all that apply)

_____ Historical studies
_____ Experimental studies
_____ Clinical studies
_____ Survey studies
_____ Education studies
_____ Collaborative research with one or more colleagues:
    _____ who are of your discipline and are at Ithaca College
    _____ who are of your discipline and are at another institution
    _____ who are not of your discipline and are at Ithaca College
    _____ who are not of your discipline and are at another institution
_____ Other (please specify) _____________________________

3. How would you assess your research skills? (Answer each item)

	Adequate	Needed
Identifying research problems	_____	_____
Defining the research objectives	_____	_____
Data collection	_____	_____
Statistical analysis of data	_____	_____
Developing a research design	_____	_____
Writing a proposal	_____	_____
Getting funded	_____	_____
Writing the paper or abstract	_____	_____
Getting the paper published	_____	_____
Presenting the paper	_____	_____
Other needed skills (please specify)	_____	_____

4. What research-related continuing educational activities would be of interest to you? (check all that apply)

_____ Correspondence course in Research Fundamentals
_____ Workshops
_____ Self-instructional module
_____ Consultation service to assist with writing proposals/papers
_____ Academic course
_____ Other (please specify) _____________________________

5. What is your highest level of education?
_____ Bachelor of Science Degree
_____ Masters Degree in progress
_____ Masters Degree completed
_____ Doctorate in progress
_____ Doctorate completed

6. What research-related courses did you complete? (Please check all that apply)
_____ One or more Undergraduate course(s) in statistics
_____ One or more Graduate course(s) in statistics
_____ One or more Undergraduate course(s) in research methodology
_____ One or more Graduate course(s) in research methodology
_____ Other (please specify) ______________________________

7. In your formal education what research experiences did you have? (Please check all that apply)
_____ Undergraduate research project
_____ Masters Thesis
_____ Masters "Project" (non-thesis)
_____ Internship research project
_____ Doctoral Dissertation
_____ Other (please specify) ______________________________
_____ None

INVOLVEMENT IN RESEARCH ACTIVITIES

8. On an average, approximately how much time per week do you spend in research-related activities?
_____ Total number of hours

9. Given your personal interests and current responsibilities, and present time commitment to research would your preference be to
_____ spend less time in research activities?
_____ spend more time in research activities?
_____ keep research time as it is?

10. Indicate the number of research projects in which you participated since September 1983. (Include projects in progress at that time)
_____ number as principal investigator
_____ number as co-investigator
_____ number for which you collected data for other investigators

11. Since September 1983, for how many research proposals or articles did you survey the current literature?
_____ as principal investigator or first author
_____ as co-investigator or co-author
_____ to assist others in their projects; not listed as an author

12. Since September 1983, how many research proposals did you write?
_____ as principal investigator or first author
_____ as co-investigator or supportive author

13. Of the research proposals included in question #12 above, how many resulted in publication and/or presentation?
_____ as principal investigator or first author
_____ as co-investigator or supportive author

14. *Since September 1983, how many times have you presented at national or state meetings or conferences?*

number of presentations

Symposium/Major Session (non-research)............ _______
Major Scientific/Research Paper.................... _______
Poster Session.................................... _______
Case Study/Brief Presentation...................... _______
Round Table/Panel.................................. _______
Other (please specify)............................. _______

15. *Since September 1983, how many articles have been published (or accepted for publication) in which you were the primary or supporting author?*

_____ *as principal investigator or first author*
_____ *as co-investigator or supportive author*

16. *Have you been the primary or supporting author of other research-related publications such as abstracts or review of published research?*

_____ *yes* _____ *No* *How many total?* _____

continued next page

COLLABORATIVE RESEARCH

Please answer yes or no for each response opportunity.

	Within your discipline, at Ithaca College	*Within your discipline, at another institution*	***Not** within your discipline, at Ithaca College*	***Not** within your discipline, at another institution*
17. *Have you engaged in collaborative research since Sept. 1983 (include projects in progress at that time)*	______	______	______	______
18. *Do you have research ideas that might be amenable to collaborative work?*	______	______	______	______
19. *What have been, or what do you think would be, the major obstacles to your engaging in collaborative research?*				
a. *Finding a collaborator with similar interests*	______	______	______	______
b. *Communication with collaborator (e.g., agreement on hypothesis, design, analysis of data, etc.)*	______	______	______	______
c. *Logistics (e.g., setting up meetings, finding secretarial support, etc.)*	______	______	______	______
d. *Attitude differences with collaborator (e.g., different degree to which each wishes to engage in research, basic philosophical differences, etc.)*	______	______	______	______
e. *Other (please specify)* ______________________________ ______________________________ ______________________________	______	______	______	______

20. Do you have a research project(s) that you have not submitted for publication?

_____ yes _____ no

RESEARCH ENVIRONMENT WITHIN YOUR SCHOOL (in contrast to Ithaca College as a whole)

21. How would you characterize the research environment within your school? Circle the appropriate number on the continuum below:

POSITIVE ASPECT								NEGATIVE ASPECT
Research activities are rewarded	1	2	3	4	5	6	7	Research activities are not rewarded
Research is given high priority	1	2	3	4	5	6	7	Research is given low priority
Professional resources are available	1	2	3	4	5	6	7	Professional resources are limited
There are many research opportunities	1	2	3	4	5	6	7	Research opportunities are lacking
There is computer accessibility	1	2	3	4	5	6	7	Computer availability is lacking
Research is administratively supported	1	2	3	4	5	6	7	Research is not supported
Research is financially supported	1	2	3	4	5	6	7	Research is not supported
My department supports research	1	2	3	4	5	6	7	My department is not supportative
My coworkers encourage research involvement	1	2	3	4	5	6	7	Colleagues ignore research involvement
Statistical services are available	1	2	3	4	5	6	7	Statistical services are lacking

RESEARCH ENVIRONMENT WITHIN THE COLLEGE

22. How would you characterize the research environment at Ithaca College?

Research activities are rewarded	1	2	3	4	5	6	7	Research activities are not rewarded
Research is given high priority	1	2	3	4	5	6	7	Research is low priority
Professional resources are available	1	2	3	4	5	6	7	Professional resources are limited

POSITIVE ASPECT								*NEGATIVE ASPECT*
There are many research opportunities	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*Research opportunities are lacking*
Research is financially supported	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*Research is not supported*
Research is administratively supported	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*Research is not supported*
There is computer accessibility	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*Computer availability is lacking*
Statistical services are available	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*Statistical services are lacking*

COMMENTS:

PLEASE RETURN TO GEORGE VAN SON OR SUSAN PRITCHARD BAILEY.

DEADLINE FOR RETURN OF SURVEY: October 31, 1985.

THANK YOU FOR YOUR HELP.

This survey has been revised from the original and with the permission of M. Rosita Schiller, Ph.D., R.D., The Ohio State University, 1985.

SCHOOL OF ALLIED HEALTH PROFESSIONS
UNIVERSITY OF NEBRASKA MEDICAL CENTER
OMAHA, NEBRASKA 68105

FACULTY QUESTIONNAIRE ON RESEARCH

Answer the following questions as accurately as possible. For each question below, use the following scale for your answer:

A = STRONGLY AGREE B = AGREE
C = DISAGREE D = STRONGLY DISAGREE E = NOT APPLICABLE

______ 1. Faculty development seminars on research are needed.
______ 2. I would attend faculty development seminars on research.
______ 3. The School of Allied Health should emphasize research at the faculty level.
______ 4. The School of Allied Health should emphasize research at the student level.
______ 5. Research endeavors are necessary for the survival of the School of Allied Health Professions.
______ 6. An annual research forum for allied health students would be a valuable experience.
______ 7. PRESENTLY, the students in our program perform research.
______ 8. PRESENTLY, the students in our program take an introductory course on research methodologies.
______ 9. There should be an interdepartmental course on research methodologies available to all students in the School of Allied Health Professions.
______ 10. The students in our program should know how to perform research.
______ 11. The students in our program should perform research.
______ 12. I have a need to perform research.
______ 13. The students in our program have time (2 hours/week) for a class on research.
______ 14. Our program would provide computer support to assist in research.
______ 15. There is clerical support within our program to assist in research.
______ 16. Financial support exists within our department for research projects.
______ 17. Equipment exists within our department which is available for research projects.
______ 18. I am involved in too many other activities to engage in research projects.
______ 19. I am involved in too many other activities to advise student research projects.

What research efforts are you participating in at present. Please give specific titles of projects and your role in them. If you are working with students on research courses or activities, please describe ______

PLEASE INDICATE YOUR APPOINTMENT IN THE SCHOOL OF ALLIED HEALTH PROFESSIONS:

	FULL TIME	COURTESY	VOLUNTEER
ASSISTANT INSTRUCTOR			
INSTRUCTOR			
ASSISTANT PROFESSOR			
ASSOCIATE PROFESSOR			
PROFESSOR			

Appendix C

Survey of

Faculty Research Interests

School of Allied Medical Professions
The Ohio State University

Definitions: Research is defined as the careful, systematic, patient study and investigation in some field of knowledge, undertaken to establish facts or principles. A researcher is one who carries out an unbiased research plan and collects objective data whether he/she wears a white lab coat or does historical research in a library. Collaborative research implies the sharing of responsibility for a joint project.

Directions: Please read each question carefully. Check the appropriate response(s) for each question or write-in the requested information.

DEMOGRAPHICS

1. What is your highest level of education?
_____Certificate/Diploma
_____Associate Degree
_____Bachelor of Science Degree
_____Masters Degree in progress
_____Masters Degree completed
_____Doctorate in progress
_____Doctorate completed
_____Other

2. If your highest degree is in a discipline other than your professional field, state the academic level of your professional degree.
____

3. What is your academic rank?
_____Instructor
_____Assistant Professor
_____Associate Professor
_____Professor
_____Other (Please specify)__________

4. What is your tenure status?
_____Tenured
_____Not-tenured, but pursuing tenure
_____Tenure does not apply

5. How many years were you a practitioner prior to assuming a faculty position? ______________________

6. How many years have you held a faculty position? ______________________

7. How many regular-salaried faculty members are in your program?
_______________Full-time _______________Part-time

8. What is your primary academic role?
_____Educator _____Program Director _____Dean

9. What research-related course did you complete? (Please check all that apply)
______One or more undergraduate course(s) in statistics
______One or more graduate course(s) in statistics
______One or more undergraduate course(s) in research methodology
______One or more graduate course(s) in research methodology
______Other (Please specify) ________________________________

10. In your formal education what research experiences did you have? (Please check all that apply)
______Undergraduate research project
______Masters Thesis
______Masters "Project" (non-thesis)
______Internship research project
______Doctoral Dissertation
______Other (Please specify) ________________________________
______None

11. How would you characterize your institution?
______Hospital-based certificate program
______2-year Community/Technical college
______4-year Liberal Arts College/University
______4-year Professional College/University
______4-year Major Research University or Academic Health Center

12. What is the average faculty:student ratio (FTE) in your program?
____

13. What level of students do you teach? (Please check all that apply)
_____Associate _____Baccalaureate
_____Certificate _____Graduate
_____Other (Please specify) ________________________________

INVOLVEMENT IN RESEARCH ACTIVITIES

14. On an average, approximately how many hours per week do you spend on your own research activities? _______Total number of hours

15. Given your current responsibilities, would your preferences be to:
______spend less time in research activities?
______spend more time in research activities?
______keep research time as it is?
______not applicable

16. Indicate the number of research projects in which you participated since 1980:
______number as principal investigator
______number as co-investigator

17. In what type of research do you participate? (Please check all that apply)

_____Historical studies

_____Survey studies

_____Clinical studies

______Experimental studies

______Quasi-experimental studies

______Education studies

_____Other (Please specify) ________________________

18. How many research proposals have you written since 1980?

______as principal investigator or first author

______as co-investigator or co-author

19. How many research projects did you have approved since 1980?

As principal investigator:

_____approved with funding

_____approved without funding

As co-investigator:

______approved with funding

______approved without funding

20. With whom do you usually participate in research studies? (Please check all that apply)

______Colleagues in your discipline at your institution

______Colleagues in your discipline at another institution

______Colleagues not in your discipline at your institution

______Colleagues not in your discipline at another institution

______No one

21. In the past five years how many times have you presented at national, regional, or state meetings or conferences?

Number of Presentations

Symposium/Major Session (non-research) . . . . .________

Major Scientific/Research Paper. . . . . .________

Poster Session . . . . .________

Case Study/Brief Presentation/Abstract . . . . .________

Panel Discussion . . . . .________

Other (Please specify) ____

22. How many research articles which you authored have been published or accepted for publication since 1980? (indicate number)

As primary author:

_____In refereed journals ______In non-refereed journals

As co-author:

_____In refereed journals ______In non-refereed journals

23. How many other (non-research) articles including abstracts, literature reviews, position papers, theoretical exposition, case studies, commentaries, etc. have you authored or co-authored since 1980?

______Principle Investigator in refereed journal

______Principle Investigator in non-refereed journal

______Co-Author in refereed journal

______Co-Author in non-refereed journal

RESEARCH INTERESTS AND NEEDS

24. Would you be interested in collaborative research studies?

______Yes

______No (go to question 28)

25. If you are interested in collaborative research, with whom would you collaborate? (Please check all that apply)

______Colleagues in your discipline at your institution
______Colleagues in your discipline at another institution
______Colleagues not in your discipline at your institution
______Colleagues not in your discipline at another institution

26. If you are interested in collabortive research, do you see yourself as having the interest and skills to (please check):

______serve as an organizer and take responsibility for proposal writing and implementation?
______serve as co-investigator, help design studies and assist with proposal writing?
______collect data as requested by other investigators?

27. Would you be interested in attending a national or regional conference on collaborative research? _____Yes ______No

28. How would you assess your research skills?

	Adequate	Needed
Identify research problems	________	________
Defining the research objectives	________	________
Data collection	________	________
Statistical analysis of data	________	________
Developing a research design	________	________
Writing protocols	________	________
Writing a proposal	________	________
Getting funded	________	________
Writing the paper or abstract	________	________
Getting the paper published	________	________
Presenting the paper	________	________

Other needed skills (Please specify)______________________________

29. What mode of research-related continuing educational activities would be of interest to you?

______Correspondence course
______Workshops at your national/regional professional meetings
______National/regional seminars or conferences
______Self-instructional module
______Consultation service
______Other (please specify)______________________________
______None

RESEARCH ENVIRONMENT

30. How would you characterize the research environment at your place of work? Circle the appropriate number on the continuum below.

Research activities are not rewarded	1 2 3 4 5 6 7	Research activities are rewarded
Research is low priority	1 2 3 4 5 6 7	Research is given high priority
Professional resources are limited	1 2 3 4 5 6 7	Professional resources are available
Not personally interested in research	1 2 3 4 5 6 7	Personally interested in research
Research opportunities are lacking	1 2 3 4 5 6 7	There are many research opportunities
Computer availability is lacking	1 2 3 4 5 6 7	There is computer accessibility
Research is not supported	1 2 3 4 5 6 7	Research is financially and administratively supported
Department is not supportive of research	1 2 3 4 5 6 7	Professional department supports research
Colleagues ignore research involvement	1 2 3 4 5 6 7	My coworkers encourage research involvement
Statistical services are lacking	1 2 3 4 5 6 7	Statistical services are available
Research is not important for promotion and tenure	1 2 3 4 5 6 7	Research is important for promotion and tenure
Ambiguity between relative importance of research vs. teaching vs. service.	1 2 3 4 5 6 7	The relative of importance of research vs. teaching vs. service is well defined.

THANK YOU FOR YOUR TIME AND COOPERATION!

COMMENTS:

Please return completed form in enclosed envelope to:

MD
School of Allied Medical Professions
The Ohio State University
1583 Perry Street
Columbus, OH 43210

This survey has been revised from the original and with the permission of M. Rosita Schiller, Ph.D., R.D., The Ohio State University, 1985.

Appendix D
Alumni Profile Data Sheet
(P. Wilson and P. Poindexter)

SCHOOL OF ALLIED MEDICAL PROFESSIONS

I. Demographic Information

1. Name ____

2. Address ______________________________________

3. Telephone ____________________________________

4. Ethnic background: (check one)

_____ (a) Black

_____ (b) Hispanic

_____ (c) Asian American

_____ (d) Native American

_____ (e) Other (specify): ______________

5. Sex ________________

6. Age (optional) ________________

II. Educational Information

7. Specific Allied Health Program (check one)

___ (a) Circulation Technology

___ (b) Medical Communication

___ (c) Medical Dietetics

___ (d) Medical Illustration

___ (e) Medical Record Admin.

___ (f) Medical Technology

___ (g) Nurse Anesthesia

___ (h) Occupational Therapy

___ (i) Physical Therapy

___ (j) Radiologic Therapy

___ (k) Respiratory Therapy

8. What stimulated your interest in Allied Health? ____________
____

9. Date of Graduation ____________________________

10. Degree obtained in SAMP: B.S. ________________

Post Baccalaureate Certificate ________________

11. Specialty Certification Licensure and/or Registration ______

12. Highest degree obtained: BS/BA ____ MS/MA ____ MD ___ PhD __

Other ______________________________

13. Other academic institutions attended and degrees obtained:

____

II. Employment: **Please answer this section as it related to your most recent or current position in health care.**

14. Classify your position. (check one)

____ (a) Self-employed
____ (b) Public health agency
____ (c) Academic institution
____ (d) General hospital
____ (e) Specific hospital (specify): ______
____
____ (f) Nursing home
____ (g) Other (specify)
____

15. What is your title in your current position? (check one)

____ (a) Clinician/staff
____ (b) Instructor/professor
____ (c) Administrator/supervisor
____ (d) Other (specify) ________

16. How many persons of your profession are on the staff of your organization? ________________________________

17. What are your responsibilities in the following area?

(a) Administration ________________________
(b) Education ________________________
(c) Clinical setting ________________________

IV. Impressions:

18. What is the role of the emerging allied health professional in the 80's? ________________________________
____
____
____

19. What words of wisdom could you provide minority students who are planning to enroll or are presently enrolled in an allied health profession? ________________________________
____
____

20. If possible, please include a 3 x 5 black and white photograph of yourself.

Thank you for taking the time to complete this questionnaire. You will receive a copy of this profile study upon conclusion.

Peggy Wilson, M.S., MT(ASCP)SM, CLS(NCA)
Assistant Professor
School of Allied Medical Professions
The Ohio State University

Meeting of the
Collaborative Research in Allied Health Consortium
September 18, 1986

I. Welcome and Introductions

II. Report on the Consortium Membership

- A. 15 Schools and Colleges of Allied Health in 6 states. (see attached list)
- B. Next steps
  1. Continued growth in membership?
  2. Brief description of known collaborative research activities.
  3. Development of member institution descriptive information including numbers and types of educational programs, clinical affiliates with opportunities for research, resources and research expertise available.
  4. Development of member institution individual areas of past research and current interests.
  5. Seek external funding for administration of Consortium.

III. Suggestion for Communications Linking Network

- A. Use of electronic bulletin board (see attached proposal by Van Son)

IV. Plans for Mid-year Workshop on Designing and Developing Collaborative Research

- A. A process oriented approach directed by Dr. Barbara Hansen.
- B. The workshop would include opportunities for small group discussions centered around thematic collaborative research. Principle investigators will lead each of the small group activities so that each participant leaves with involvement (voluntary) in a collaborative research effort.
- C. Discussion about dates/times, other.

V. Other

VI. Adjournment

COLLABORATIVE RESEARCH IN ALLIED HEALTH CONSORTIUM

Purpose, Structure and Processes

INTRODUCTION

In recent years, research in the allied health professions has become a priority issue across the nation. Educators and practitioners alike are obligated to investigate effectiveness and efficiency in teaching and the delivery of health care services. Many of the research initiatives in allied health education or clinical investigation can be strengthened by inter-institutional or interdisciplinary collaboration.

Collaborative research can be facilitated through the creation and operation of a consortium of institutions with allied health educational programs and/or service units. Voluntary participation in such a consortium would foster "horizontal building" research in which a single theoretical area can be studied by individuals investigating complementary pieces of the area. In addition, collaborative research through a consortium would foster "vertical building" in which the same questions or modifications of the question are asked in two or more subsequent studies.

PURPOSE

The purpose of the Collaborative Research in Allied Health Consortium is to facilitate:

1. identificaiton of timely research questions;
2. collaboration through intercollegiate and interdisciplinary research efforts and resource sharing;
3. application for external funding;
4. dissemination of research findings in a timely and functional manner.

Allied health research can be strengthened through the collaborative efforts of the Consortium by: a) increasing the number of subjects available for study in a short period of time; b. enhancing the generalizability of data gathered at multiple institutions; c) maximizing the talent and resources of multiple institutions; and d) prompting direct replication or replication with expansion of existing studies. Beyond collaboration, the coinsortium will facilitate corroboration between an experienced investigator in a specific area and a new investigator in the same area. Applications for external funding should be strengthened for each institution participating in the consortium.

STRUCTURE AND PROCESSES

The consortium consists of a "center" housed at the School of Allied Medical Professions of The Ohio State University, and "member" institutions having one or more allied health educational programs, and/or one or more allied health service units. Participation will be strictly voluntary without financial obligation, with both the center or member institutions participating in the development and implementation of mutual obligations, policies and procedures. Leadership for the consortium is provided by an executive committee composed of one representative from each of the member institutions and the center. For each collaborative research project, an individual at any member institution can serve as the principal investigator with co-investigators at the collaborating institutions. Collaboration is not limited to member institutions in the Consortium. Any member institution can seek external funding on behalf of the Consortium retaining the primary award at that institution and subcontracting with institutions of the co-investigators.

CONSORTIUM "CENTER" OBLIGATIONS

The Consortium center will serve as the communication resource center to help establish linkages between individuals in member institutions for collaborative research. Specific activities include but are not limited to:

1. Maintain a data base of consortium members' areas of research (for corroboration) and current collaborative research interests.
2. Communicate with individuals from member institutions seeking corroborators or collaborators for specific research topics.
3. Identify timely research initiatives.
4. Maintain progress reports on Consortium collaborative research efforts.
5. Facilitate dissemination of completed collaborative research.

CONSORTIUM "MEMBER" OBLIGATIONS

Consortium member obligations include:

1. Provide a letter of agreement to participate in the consortium.
2. Identify an individual to serve as the spokesperson for the member institution.
3. Provide information about the member institution, individual areas of past research and current interests.
4. Participate in the development and ongoing function of the consortium.
5. Provide information to the center about Consortium collaborative research efforts.

COLLABORATIVE RESEARCH IN ALLIED HEALTH CONSORTIUM

Center

The Ohio State University School of Allied Medical Professions 1583 Perry Street Columbus, Ohio 43210-1234	John R. Snyder, Ph.D. Associate Director (614) 292-9579

Voluntary Member Institutions

Bowling Green State University College of Health and Human Services Bowling Green, Ohio 43403-0280	Michael Rastatter, Ph.D. Associate Dean (419) 372-8242
Eastern Kentucky University College of Allied Health and Nursing 203A Rowlett Building Richmond, Kentucky 40475-0956	David D. Gale Dean (606) 622-1523
Ithaca College School of Allied Health Professions Speech Pathology-Audiology Ithaca, New York 14850	L. George Van Son, Ed.D. Associate Professor (607) 274-3248
Northern Illinois University School of Allied Health Professions 217 Williston Hall DeKalb, Illinois 60115-2854	Olive M. Kimball Director (815) 753-1381
Ohio University College of Health and Human Services 011 Grosvenor Hall Athens, Ohio 45701-2979	Michael Harter, Ph.D. Associate Dean (614) 594-5712
Rush University Department of Health Systems Management 202 Academic Facility Chicago, Illinois 60612	Gerald L. Glandon Assistant Professor (312) 942-5402
State University of New York at Buffalo School of Health Related Professions 435 Stockton Kimball Tower Buffalo, New York 14214	Phillip D. Shannon, MA, MPA, OTR, FAOTA Associate Dean (716) 831-3434
State University of New York at Stony Brook Department of Allied Health Resources Health Sciences Center Stony Brook, New York 11794-8200	Alan Leiken, Ph.D. (516) 444-2251 ext. 2

State University of New York at Syracuse College of Health Related Professions 750 Adams Street Syracuse, New York 13210	Donald C. Goodman, Ph.D. Dean (315) 473-6562
Temple University College of Health Professions Department of Physical Therapy 3307 N. Broad Street Philadelphia, Pennsylvania 19140	Christopher E. Bork,Ph.D. Interim Chariperson (215) 221-4815
Thomas Jefferson University College of Allied Health Sciences Room 221, J.A.H. Philadelphia, Pennsylvania 19107	Kevin J. Lyons, Ph.D. Associate Dean (215) 928-8188
University of Kentucky College of Allied Health Professions Albert B. Chandler Medical Center Room 219 Annex 2 Lexington, Kentucky 40536-0080	Marie C. Vittetoe, Ed.D (606) 233-5686
University of Pittsburgh School of Health Related Professions 111A Pennsylvania Hall Pittsburgh, Pennsylvania 15261	William L. Sumner, Ph.D. Associate Professor (412) 624-2907
University of Pittsburgh School of Health Related Professions 309 Pennsylvania Hall Pittsburgh, Pennsylvania 15261	Valerie M. Watzlaf Instructor (412) 624-2320
Western Michigan University College of Health and Human Services Kalamazoo, Michigan 49008	Jane Prochnow-LaGrow Coordinator of Research (616) 383-8116

ABSTRACT

Consortium Communiction Via CBBS
by L. George Van Son, Ed.D.
Ithaca College
Ithaca, New York
August, 1986

A most significant variable in the success of any collaborative effort is the level of communication experienced by participants. At present, there exists some 450 Electronic Mail or Computer Bulletin Board Systems in the country, most of them privately run. It is proposed as a first step in establishing linkage with consortium member institutions that such a system be implemented to serve the communication needs of the consortium.

The process is relatively simple, cost-effective and easy to install using existing equipment. Part of the proposal workshop dealing with systematic advances towards consortium research could be devoted to a presentation of the step-by-step procedure necessary to accomplish this fundamental asset.

To establish a CBBS system for the consortium, each institution would need the following:

1. A standard personal computer with a communications card.
2. A modem capable of automatically answering the phone.
3. CBBS software

The workshop presenter would be L. George Van Son; however, anyone interested in sharing the presentaiton is welcome. Ideas regarding special needs to be included in the software will be solicited from the institution.

COLLABORATIVE RESEARCH IN ALLIED HEALTH SYMPOSIUM

September 18, 1986

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